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The Incidence of Splenomegaly in Vizagapatam with Special Reference to its Association with Cirrhosis of the Liver, as Gleaned from a Study of the Autopsy Records

By RAO SAHIB T. S. TIRUMURTI, B.A., M.B. & C.M., D.T.M. & H., (Lond.),
Professor of Pathology, Medical College, Vizagapatam,
and
M. V. RADHAKRISHNA RAO, M.B., B.S., Research Fellow, Andhra University.
(*From the department of Pathology, Medical College, Vizagapatam.*)

The spleen, as compared to other organs in the body, is more liable to enlargement in disease. The enlargement is noticed not only in acute infections, but also in many chronic diseases. On account of its accessibility to direct palpation, an enlarged spleen is of great clinical value for diagnosis to the physician. The enlargement of the spleen is more common in the tropics, where it is due to protozoal infections, *e. g.*, malaria, kala-azar and schistosomiasis (Egyptian splenomegaly). The geographical distribution of the diseases producing marked enlargement of the spleen varies even in the tropics ; *e. g.*, the splenomegaly due to Schistosoma Mansoni is commonly seen in Egypt and Northern Nyasaland, whereas kala-azar and malaria are more widely distributed in the other tropical countries.

In this paper, we wish to present our observations on the enlargements of the spleen in this part of India. Our attention was particularly drawn to the association of splenomegalies with cirrhosis of the liver ; these spleens were examined specially for the purposes of this article and the results of those observations are discussed in the following pages.

Material

The material concerned in this paper is the result of an analysis of 490 autopsies performed in the King George's Medical College Hospital, Vizagapatam, during the past seven years (from 17th July 1925 to 17th October 1932). Such material collected from the autopsies from a series of unselected cases in a general hospital like the King George Hospital, should furnish to a reliable extent, the common causes of splenomegaly in this part of the country. The results obtained from an analysis of this autopsy material are tabulated in the following tables :

The average weight of a normal spleen as met with in medico-legal post-mortem examinations varies from 100 to 150 grams (M. N. De, 1932). Remarking on the weight of the spleen, McNee (1931) observes : "In man many observations on the weight of the normal spleen at different ages were made by Henry Gray (1854) and he believed that the organ should be largest when most active in functional capacity. In a series of 160 spleens he noted that

the organ is largest during youth and active adult life [average weight 6-7 oz. *i. e.* 180 to 210 grams in the adult], but that in old age the weight, both actual and relative to body weight, decreases, until in those over 60 years of age the average is only 4½ oz." Hence, spleens weighing more than 180 grams are taken as slightly enlarged, while those weighing more than 200 grams as moderately enlarged. Out of the 490 autopsies, 218 cases (44·5 per cent) showed enlarged spleens, varying in weight from 180 to 1500 grams and above. The causes of enlargement of the spleen in these 218 cases are tabulated in Table II.

Table I shows the primary cause of death in the 218 cases with enlargement of the spleen. In most of the cases, the primary cause of death was the same as that producing the enlargement of the spleen. But, in two cases (P. M. Nos. 189 and 222), the primary cause of death was due to rupture of an enlarged spleen. It is well known that persons with enlarged spleens are always in potential danger, as sometimes even a trivial injury may result in their rupture. In case No. 189, the spleen weighed 2430 grams and the rupture was apparently spontaneous.

TABLE II shows the causes of enlargement of the spleen in the 218 cases under review. It may be noted in this connection that no case of splenomegaly associated with Gaucher's disease, acholuric jaundice, OSLER's disease (polycythemia vera, Vaquez's disease) or schistosomiasis (Egyptian splenomegaly) is recorded in this collection. Gumma or malignant disease of the spleen, primary or secondary, are not seen in this list. Also kala-azar is very rare in this district, as may be ascertained from the clinical records of the King George Hospital, and from the post-mortem records of the King George's Medical College Hospital. Even the few cases which were occasionally seen in the Medical Wards were imported ones from the endemic areas. Only one case (P.M. No. 159) of kala-azar was noted in the autopsy records and this patient gave a history of fever with enlargement of the liver and spleen, after his stay in Calcutta for some time. Though chronic malaria is one of the commonest causes of enlargement of the spleen, as noted clinically in the Medical wards of the King George Hospital, the same feature is not found in the analysis of the autopsy observations in this series. Moderate enlargement of the

TABLE I.

Showing the Primary cause of death in 218 cases with enlargement of the spleen.

Serial No.	Primary causes of death.	Number of cases.
1	Heart disease	30
2	Septicaemia	22
3	Portal cirrhosis of the liver ...	13
4	Syphilitic cirrhosis of the liver ...	3
5	Hypertrophic biliary cirrhosis (non-obstructive) ...	2
6	Infantile biliary cirrhosis ...	2
7	Broncho pneumonia ...	6
8	Pneumonia	7
9	Acute miliary tuberculosis (generalised) ...	7
10	Tuberculosis	8
11	Amoebic dysentery ...	5
12	Bacillary dysentery ...	5
13	Amoebic abscess of the liver ...	1
14	Acute malaria	6
15	Chronic malaria ...	2
16	Septic peritonitis ...	9
17	Chronic peritonitis ...	2
18	Pelvic cellulitis	1
19	Pernicious anaemia ...	4
20	Ulcerative colitis ...	8
21	Haemorrhage after operation ...	4
22	Splenic anaemia (?) ...	5
23	Hydrophobia	4
24	Shock after operation ...	5
25	Uraemia	1
26	(*a*) Carcinoma—	
	Stomach	2
	Primary carcinoma liver ...	3
	Palate	2
	Pharynx	1
	(*b*) Sarcoma	2
27	Lymphatic leukaemia ...	3
28	Poisoning	2
29	Suicide	5
30	Adhesive pericarditis ...	4
31	Beri Beri	6
32	Ankylostomiasis ...	2
33	Meningitis	3
34	Subacute parenchymatous nephritis	1
35	Chronic interstitial nephritis ...	2
36	Gas gangrene	1
37	Apoplexy	1
38	Cerebral thrombosis and softening	1
39	Rupture of enlarged spleen ...	2
40	Rupture of the liver ...	1
41	Subacute bacterial endocarditis ...	1
42	Hodgkin's disease ...	1
43	Head injuries	3
44	Acute yellow atrophy of the liver	2
45	Tumour brain	1
46	Abscess brain	1
47	Cause of death not evident ...	3

spleen was found in cases of decompensated heart disease, cirrhosis of the liver, malaria, septicaemia and acute infections. Marked enlargement of the spleen was seen in some cases of cirrhosis of the liver, in kala-azar and in some cases which have been put down to splenic anaemia. The enlargement of the spleen in all the other cases which are not included under the broad groups 1 to 14 in table II, are included under the miscellaneous group. Under group formation described by McNEE (1932) is not seen in this series.

The association of chronic indolent ulcers of the leg with splenomegaly, was pointed out by STUKELEY (1722) and McNEE (1931). Such a syndrome was seen in one case (P. M. No. 446) in this series, in which the spleen weighed 1770 grams.

TABLE II.

Showing the causes of enlargement of the spleen in 218 cases.

Serial Number	Cause of enlargement.	Weight of spleen in grams.					
		180 to 200 grams.	200 to 500 grams.	500 to 1000 grams.	1000 to 1500 grams.	Above 1500 grams.	Total.
1	Heart disease	3	27	6	...	...	36
2	Cirrhosis of the liver ...	7	14	6	6	3	36
3	Acute malaria ...	2	7	...	...	...	9
4	Chronic malaria ...	..	9	2	...	...	11
5	Kala-azar	...	...	...	...	1*	1
6	Lymphatic leukaemia ...	...	2	1	...	...	3
7	Miliary tuberculosis ...	1	7	2	...	...	10
8	Caseating tuberculosis ...	...	...	1	...	...	1
9	Hodgkin's disease ...	...	...	1	...	...	1
10	Acute infection ...	...	3	...	...	...	3
11	Amyloid disease ...	1	...	...	...	...	1
12	Septicaemia ...	5	46	2	...	...	53
13	Pernicious anaemia ...	1	1	2	...	...	4
14	Splenic anaemia (?) ...	...	...	...	1	4	5
15	Undetermined ...	...	8	6	1	2†	17
16	Miscellaneous ...	4	20	3	...	...	27

* The spleen in this case weighed 2130 grams.

† One spleen in this series weighed 2430 grams and the other weighed 1770 grams.

15 ('Undetermined') in Table II are included all those cases in which the cause of enlargement of the spleen could not be determined even after a thorough examination—macroscopic and microscopic, of the different organs removed at autopsy. One spleen in this group, weighed 2430 grams and the cause of death was due to rupture of the spleen, which was probably spontaneous. The type of splenomegaly associated with marked reticulo-endothelial hyperplasia and giant cell

The characteristics of the enlarged spleen in the various groups in Table II are described below in detail.

THE CHARACTERISTICS OF THE SPLENIC ENLARGEMENT IN THE VARIOUS DISEASES (COMMENT ON TABLE II).

Heart Disease :

In decompensated heart disease, the enlargement of the spleen is usually moderate, the

capsule is smooth and tense and the organ is fairly hard. On section, it is deep chocolate in colour, and the Malpighian bodies and the trabeculae are prominent. Microscopically, there is marked congestion of the sinuses with thickening of the trabeculae and increase of connective tissue. Thus, the enlargement of the spleen, especially in long standing cases is due to chronic passive congestion and mild replacement fibrosis (cyanotic induration).

Cirrhosis of the Liver.

The spleen is generally enlarged in cirrhosis of the the liver and according to KLOPSTOCK (1907) it is enlarged in 80 percent of the cases. In the present series of 36 cases of cirrhosis of the liver (Table III), the spleen was moderately enlarged in 29 cases (80.6 per cent). "In 147 cases of cirrhosis examined at St. George's Hospital the average weight of the spleen was 10 ounces. So that if the weight of the normal spleen be taken as 7 ounces, there is seen to be a very definite increase in cirrhosis." (ROLLESTON and MCNEE, 1929). Whereas in 14 cases (38.8 per cent) in Table III the spleen showed the average weight usually seen in cases of cirrhosis of the liver in 15 cases (41.8 percent) the spleen showed a marked enlargement. Thus, there are two distinct groups of cirrhosis of the liver ; in one, the enlargement of the spleen is moderate and can be accounted for, while in the other there is marked splenomegaly. The characteristics of the enlargement of the spleen in both these groups are described below. As shown in our previous papers (TIRUMURTI and RADHAKRISHNA RAO, 1932 ; RADHAKRISHNA RAO, 1932) portal cirrhosis is the commonest type of cirrhosis met with in this district.

In the first group, there was moderate enlargement of the spleen, the capsule of which was thickened and showed perisplenitis ; the organ was adherent (in most cases) to the neighbouring viscera and to the diaphragm and abdominal wall. It was fairly firm in consistency and dark red in colour. On section, the cut edge was sharp. But, when the cause of death was due to some intercurrent infection, the spleen was soft with diffluent pulp. On the cut surface the Malpighian bodies, trabeculae and the vessels were seen prominently. Microscopically all the sinuses were dilated and full of blood ; their walls were thickened and there was a moderate increase in the connective tissue due to the proliferation of the reticular tissue of the pulp. In all long standing cases, there was an increase in the trabeculae. There was no great accumulation of the cells in the pulp.

TABLE III.

Showing the degrees of the enlargement of the spleen in 36 cases of cirrhosis of the liver.

Serial No.	Weight of spleen in grams.	Number of cases.	Percentage.
1.	Below ... 200	7	19.4
2.	200 to ... 500	14	38.8
3.	500 to ... 1000	6	16.7
4.	1000 to ... 1500	6	16.7
5.	Above ... 1500*	3	8.4

(* One spleen in this series weighed 1980 grams and another 2250 grams.)

In the second group, the spleen was much enlarged and there was a tendency for the notches on the anterior border to be exaggerated. The capsule showed thickening in most cases and it was adherent to the surrounding organs ; sometimes dilated veins were seen in these adhesions. The splenic vein in all these cases did not show any change. The capsule was tense and the organ was distended with blood. In one case (P. M. No. 385) in which the spleen was removed at operation, it shrunk after the escape of blood. On section, the trabeculae were visible and the cut surface showed a deep chocolate colour. The Malpighian bodies were not clearly seen. Microscopically the whole spleen was impoverished in cells and assumed an empty appearance, being composed, essentially of fibrous tissue in which the venules were embeded. (MAC CALLUM, 1928 a). The organ resembled a sponge in which the meshes were filled with red blood cells. The Malpighian bodies were atrophied and very few

of the original pulp cells were seen in the loose fibrous tissue. The arterioles in the Malpighian corpuscles were normal and there was thickening of the reticular fibres of the organ.

Malaria.

The spleen was slightly enlarged in acute malarial stage of the fever but moderately enlarged in chronic malaria. The enlargement is partly due to the continued infection and partly to the fibrosis of the organ due to the presence of the irritative pigment (the iron containing hæmosiderin) derived from the destruction of red blood corpuscles by the parasites. The organ was slaty in colour and on section presented a definitely blackish surface. Microscopically, the endothelial cells of the sinuses were seen loaded with the pigment: the pigment may also be seen in the mononuclear wandering cells and in the phagocytic cells. There was a definite increase of the connective tissue in the chronic cases.

Kala-azar.

The spleen was enormously enlarged in one case (P. M. No. 159) and weighed 2130 grams. The patient was admitted for enlargement of the liver and spleen with fever of 5 months' duration. Splenic puncture (biopsy) showed the Leishman Donovan bodies. The spleen smears (autopsy) showed the parasites in abundance. The spleen kept its shape, the notches were exaggerated and the capsule showed patchy areas of thickening. On section, it was moist and the cut surface presented a dark red colour. Microscopically no pigment was seen in the reticulo-endothelial cells as in malaria but the sinuses were engorged with red blood cells, while the pulp cells were diminished. Young connective tissue cells were seen in abundance.

Lymphatic Leukaemia.

No case of myeloid leukaemia was seen in the present series. The enlargement of the spleen was moderate in cases of lymphatic leukaemia and in chronic cases the organ was firm in consistence. On section it was brownish-red in colour and the Malphigian bodies were well seen. Microscopically, all the pulp spaces were packed with deeply staining mononuclear cells (lymphocytes) and the Malphighian bodies were made out only after closer examination. Increase of fibrous tissue was found in the later stages.

Tuberculosis.

Primary tuberculosis of the spleen is not seen in any of these cases. The miliary tuberculosis of the spleen (shown in Table II) was only a local manifestation of an acute generalised miliary tuberculosis, secondary to chronic pulmonary tuberculosis. The enlargement of the spleen was only slight and it was not the presenting sign during life. The enlargement is due to the inflammation which accompanies the development of miliary tubercles. Only one case was seen in which there was a solitary caseating tuberculous mass, and in this case enlargement of the spleen was moderate.

Hodgkin's Disease.

The spleen was enlarged to thrice its normal size in one case (P. M. No. 217) of Hodgkin's disease seen in this series. There was enlargement of the cervical, submaxillary, submental, retropharyngeal, retroperitoneal and mesenteric glands and the glands of the groin and axila. The patient died of toxaemia from extensive sloughing of the tonsils and groins and hence the spleen was soft, moist, deep brown on section, and the cut edges showed a tendency to evert. The typical infiltration of the splenic pulp with the grey nodules composed of the characteristic tissue was not seen in this case. The microscopic appearances of the enlarged lymphatic glands were typical of Hodgkin's disease.

Acute infections and Septicaemia.

The enlargement of the spleen was always constant though slight. It is due to acute congestion and splenitis. The organ was soft and the capsule tense; on section, the cut surface was moist and of reddish-brown colour and the cut edges showed a tendency to evert. The pulp was soft and diffluent and the Malpighian bodies

were not clearly visible. The appearances of the spleen in these conditions are described as 'acute splenic tumour'. Microscopically, many mononuclear cells, phagocytic cells, and cells resembling plasma cells were seen accumulated in the pulp spaces.

Amyloid Disease.

This condition was seen only in one case (P.M. No. 436) in which the death was due to lobar pneumonia. The spleen weighed 180 grams, firm in consistency and showed slight perisplenitis. The capsule was not wrinkled. On section, the cut surface was brick-red in colour and the trabecular markings and the Malpighian bodies were not well seen. The appearance of the typical 'Sago spleen' was not seen in this case. Microscopically, well marked amyloid changes were seen commencing in the capillaries of the Malpighian bodies. Amyloid changes were also seen in the liver and the kidneys. During life the urine of this patient showed plenty of albumin, pus cells, epithelial cells, hyaline and granular casts ; the sputum showed tubercle bacilli.

Pernicious Anaemia.

There was slight enlargement of the spleen in cases of pernicious anaemia and it is due to the functional overactivity of the organ concerned with the metabolism of the blood pigment. The organ was generally firm and on section was of a 'rusty' colour. The Malpighian bodies and the trabeculae were fairly well seen. The pigment (haemosiderin) derived from the excessive destruction of red blood cells in this disease, was demonstrated by the Prussian blue reaction. Microscopically, the pulp spaces were seen full of red blood cells, many of which were disintegrated and great activity (phagocytosis) of the reticulo-endo thelial cells was noticed. Most of the reticulo-endothelial cells contained the blood pigment (haemosiderin) or the disintegrated red blood cells.

Splenic Anaemia (?)

In this group, the enlargement of the spleen was considerable and the macroscopic and microscopic appearances of the spleen were similar to those described under splenomegalies associated with cirrhosis of the liver. But, in this group, no evidences of cirrhosis were found in the liver. The 'Siderotic nodules' described by GANDY (1905), MCNEE (1931) and MCMICHAEL (1931), were not seen in this variety of splenomegaly.

Traumatic Conditions etc.

Head injuries, apoplexy and cerebral thrombosis were the causes of death in five cases in which there was also enlargement of the spleen ; this was probably due to the acute congestion and cloudy swelling of the organ.

Subacute bacterial endocarditis.

This was the cause of enlargement of the spleen in one case, in which subacute vegetative endocarditis of the aortic valves was seen. The splenic enlargement was slight and was due to splenitis ; there were no infarctions.

COMMENT

The presentation of this material has proved rather difficult on account of the confusion with regard to the classification of the diseases of the spleen. In this paper, the subject is taken up for consideration under certain broad groups for the sake of discussion. As pointed out by Hutchison (1928) 'the only satisfactory classification would be an aetiological one, but of that our present knowledge does not allow'.

Malignant tumours of the spleen, either primary or secondary, are not seen in this series. "It is a well known fact that malignant tumours, both primary and metastatic, are of unusual rarity in the spleen." (MCNEE, 1931). The experimental evidence of MURPHY (1914), LAZARUS —BARLOW and PARRY (1923) also supports the clinical findings that the spleen offers resistance to the growth of malignant tumours.

The association of splenomegaly with cirrhosis of the liver has been pointed out by BANTI (1883), MCNEE (1931) and (1932), HUTCHISON (1928), MACCALLUM (1228 b) and others. Studying the incidence of splenomegaly in Bengal, M. N. DE (1932) pointed out the association of splenomegaly with cirrhosis of the liver. While there is consensus of opinion regarding the associa-

tion of splenomegaly and cirrhosis of the liver, the opinion is divided as to whether the splenomegaly is primary or secondary to the changes in the liver. In all our cases in which splenomegaly was associated with portal cirrhosis of the liver, it is not possible, even after a careful post-mortem examination and a detailed microscopic examination of the organs, to decide whether the splenomegaly was primary or secondary to hepatic cirrhosis. The macroscopic and microscopic appearances of the spleen were the same in all the cases : examination of the spleen smears did not show any parasites or pigment.

In considering the cause of splenomegaly in hepatic cirrhosis, the following hypotheses should be taken for discussion.

(*i*) One view is that the splenic enlargement is due to the chronic venous congestion resulting from the portal obstruction due to the cirrhotic changes in the liver. But, this back pressure cannot account for the marked enlargement of the spleen and MAC CALLUM (1928 b) remarks that 'enlargement is usually moderate and the great increase in the size of the spleen in connection with cirrhosis of the liver is probably due to other causes than the mere congestion.' Moreover, 'there are cases in which the spleen is enlarged before cirrhosis in the liver is at all advanced—and certainly the spleen is usually enlarged before any ascites or other definite signs of portal back pressure supervene' (MACNEE, 1932).

(*ii*) The second view is that the enlargement of the spleen is due to poisons circulating in the general circulation on account of the 'detoxicating function' of the liver being impaired as a result of the changes in the hepatic lobule in cirrhosis of the liver. As a result of the degeneration and regeneration of the hepatic parenchyma and the progressive fibrosis in cases of portal cirrhosis, the original structure of the hepatic lobule is completely lost. "Instead of lying in a continuous sheet between portal and hepatic venous trees and in the direct path way of afferent and efferent blood vessels the hepatic cell mantle is now broken up into innumerable irregular independent and anastomosing nodules, virtually all new formations, consisting of twisting columns of cells with narrow tortuous sinusoids, without a suggestion of the usual radiate arrangement. Buried in dense fibrous tissue they are almost completely side tracked from the portal blood supply, and obtain what nutriment they do in an exceedingly inefficient manner." (MC INDOE, 1927). By injecting coloured gelatin through the portal vein, MC INDOE (1927), showed that the new hepatic nodules were left entirely uncoloured, while they are reached with difficulty when injected through the hepatic artery. Thus, the hepatic artery forms the main source of blood-supply to the regenerated hepatic cells. By perfusing cirrhotic livers with normal saline at low pressures (similar to those existing in portal system) MC INDOE (1927) concluded that the bulk of the portal blood reaches the heart by the collateral channels and only a small quantity actually passes through the liver. Thus, as a result of these changes in the hepatic lobule in cirrhosis of the liver, the poisons absorbed from the intestinal tract and circulating in the portal blood are not 'presented' to the cells of the regenerated hepatic nodules and hence not 'detoxicated'. Consequently, the poisons pass into the general circulation and reach the liver and the spleen at the same time. Thus, the enlargement of the spleen is in the nature of a reactionary hyperplasia due to the poisons reaching in the general circulation. MCNEE (1932) considers this 'toxaemic view' to be very important. MOYNIHAN (1920) discussing the enlargements of the spleen in cirrhosis of the liver, remarks : "In portal cirrhosis of the liver according to QUINCKE and HOPPE-SEYLER (NOTHNAGEL's Encyclopaedia, 702), swelling of the spleen appears very early, before the symptoms of stasis, and hyperplastic condition of the pulp followed by a connective-tissue increase is noted. It would appear therefore, that active process occur also in the spleen, and vary with the primary cause of the disease."

(iii) Another cause (though rare) mentioned for the enlargement of the spleen is a 'continuation and exaggeration of morbid changes in the

spleen in latent or practically cured cirrhosis.' (ROLLESTON and MCNEE, 1929). This can be termed as a reverse of BANTI's syndrome and ROLLESTON (1929) refers to two cases of this sort seen by him, in which the spleen was greatly enlarged and the liver showed very old fibrosis.

Thus, considering the above hypotheses, we are of the same opinion as ROLLESTON and MCNEE (1929) that the great enlargement of the spleen seen in cases of cirrhosis of the liver is the result of a reactionary hyperplasia, due to poisons in the general circulation, consequent on the detoxicating function of the liver being impaired on account of the structural changes (already referred to) in the organ ; and, the chronic venous congestion due to portal obstruction aids in the absorption of the poisons, on account of the stagnation of the blood in the splenic sinuses. The enlargement of the spleen in those cases, in which the cirrhosis in the liver is not advanced, can be attributed to the same toxaemia which is responsible for the cirrhosis of the liver.

Thus, the problem of splenomegaly in hepatic cirrhosis is not easy to solve, unless the pathological changes in the two organs are studied from the commencement ; the 'end-results', as we see them at the autopsy, do not often give us a clue as to whether the splenomegaly is primary or secondary to the changes in the liver.

A similar condition of splenomegaly associated with cirrhosis of the liver in children and young adults, is described as 'splenomegalic cirrhosis.' (FRENCH, 1928). Though, this is classed as a separate entity, as FRENCH (1928) says, the relationship of this disease to 'ordinary alcoholic cirrhosis of the liver on the one hand, and, to splenic anaemia or BANTI's disease upon the other, is not clear.' But, in this disease more than one member in the family may be affected and this point may help in the clinical diagnosis.

The enlargements of the spleen described under group 14 (splenic anaemia ?) in Table II require some explanation. The appearance of the spleen, macroscopic and microscopic, were similar to those of the splenomegalies described under group 2 (cirrhosis of the liver), the only difference being, that the cirrhotic changes were not seen in the former group. It is difficult to say whether such cases would have ended in cirrhosis of the liver (the so-called BANTI's disease), if the patients had survived for some time longer. The pathological appearances of the spleen in splenic anaemia have no special characteristics as they may be seen in other conditions. Though, the microscopic appearances of the spleens in this group (No. 14. Table II) are suggestive of splenic anaemia, it is not justifiable to diagnose them definitely as such solely from the pathological evidence without a complete clinical investigation.

There has been considerable confusion with regard to the terms 'BANTI's disease' and 'splenic anaemia'. Often they are used as synonyms. "It will be generally agreed, I think, that 'splenic anaemia' and 'BANTI's disease' are to some extent diagnostic 'rag-bags' into which are thrown all the cases of enlarged spleen that cannot be placed in any other category." (Hutchison, 1931.) Classifying the diseases of the spleen on a pathological basis, MCNEE (1931) remarks :

"A classification of this kind can take no note of two terms which stand out prominently in clinical literature—splenic anaemia and BANTI's disease—although the use of these may well be inevitable in ordinary clinical use for some considerable time." In recent contribution, MCNEE (1932) suggests that the term, 'BANTI's disease' should be deleted from the nomenclature and all the cases included under this group should be classified as 'splenic anaemia' or 'hepatic cirrhosis.' If, by BANTI's disease is meant 'simply chronic splenic anaemia *plus* the features of cirrhosis of the liver, representing a terminal stage of the disease' (OSLER, W.), then four cases at least, in group 2 (in Table II) can be included under this category.

SUMMARY AND CONCLUSIONS

(*i*) This article presents the causes of enlargement of the spleen in this part of India, obtained from a critical analysis of 490 autopsies, performed in the King George's Medical College

Hospital, Vizagapatam. Splenomegalies resulting from GAUCHER's disease, acholuric Jaundice, OSLER's disease and schistosomiasis were not encountered in this series. No case of gumma or malignant disease of the spleen, primary or secondary, was noted in this collection.

(*ii*) Kala-azar is very rare here, as may be seen from the clinical and autopsy records of the Medical College Hospital, and even the few cases which were treated, were those imported from the endemic areas. Though, chronic malaria is one of the commonest causes of enlargement of the spleen, as noted clinically in the Medical Wards of the King George Hospital, the same feature is not found in the autopsy records.

(*iii*) In cases of portal cirrhosis of the liver, great enlargement of the spleen was seen in some cases. The macroscopic and microscopic appearances of the spleen in these cases are described and the causes of this splenomegaly are discussed. It is pointed out that the problem of splenomegaly in hepatic cirrhosis is not easy to decide only from the 'end-results,' which are seen at the autopsy. Unless the pathological changes from the commencement in the two organs are studied, it is not possible to state whether the splenomegaly is primary or secondary to changes in the liver. *

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* Read at the Scientific Section of the IX All-India Medical Conference held at Lucknow, December, 1932.

The Curative Value of Thio-Sarmine (Brahmachari) in the Treatment of Syphilis by the Intravenous Method

By B. G. MALLYA, M.D., F.R.C.S.E., Major, I. M. S.
Surgeon, Police Hospital, Calcutta
and
B. B. MAITY, L.M.F., Calcutta.

In his previous communications, the senior writer (B. G. M.) and co-workers published a series of cases showing the curative value of thio-sarmine (Brahmachari) in the treatment of syphilis given intramuscularly in the *Indian Medical Gazette*, Vol. LXVI, No. 11, November, 1931 and Vol. LXVII, No. 5, May, 1932. The following is a series of cases of syphilis treated by us with this compound given by the intravenous method.

GROUP I.—This series includes patients with inoculation lesions.

Total number of cases=3.

Notes of the cases :

(*a*) Indurated chancre present in all these cases.

(*b*) *Treponema pallidum* were found in the scrapings from the lesions in all cases.

(*c*) At the beginning of the treatment Wassermann reaction was negative but it became positive at the earlier stages of treatment.

Chancre healed up in all cases after 2nd. injection, Wassermann reation became negative after completion of injections, and general conditions were markedly improved.

GROUP II. This series includes patients with positive Wassermann reaction with inoculation lesions or with old healed chancre with inguinal adenitis but no other outward signs or history of general infection.

Total number of cases 9.

Notes of the cases :

(*a*) Old healed chancre with inguinal adenitis in 4 cases.

(*b*) Unhealed chancre with inguinal adenitis in 5 cases.

Local conditions healed up quickly, general conditions were markedly improved and Wassermann reaction became negative after a course of treatment in all cases. Suppurating inguinal glands were opened in 3 cases. In all the other cases no suppuration took place in the adenitis which disappeared after treatment.

GROUP III. This series includes patients with positive Wassermann reaction with outward signs and symptoms of general infection.

Total number of cases 6.

Notes of the cases :

(*a*) Cases with skin eruptions, inguinal adenitis, anaemia, pain all over the body, especially in the joints, in 4 cases.

(*b*) Cases with skin eruption, slow fever, general weakness, anaemia, constant headache etc. in 2 cases.

Eruptions disappeared after 3 injections in all cases, pain in the joints and other parts of the body quickly disappeared. Suppurating inguinal glands were opened in 2 cases. Other symptoms gradually disappeared during the early part of treatment.

GROUP IV. This series includes patients with the following conditions which appear to be of syphilitic origin. The signs and symptoms disappeared during treatment.

Total number of cases 4.

Notes of the cases :

(*a*) Wassermann reaction strongly positive.

(*b*) History of local and outward manifestations present.

(*c*) General symptoms such as anaemia, pain all over the body, giddiness, frequent headache, general weakness etc. were markedly present at the commencement of treatment.

General symptoms disappeared quickly after a few injections, general health markedly improved, Wassermann reaction became negative in all cases, except in one case which remained moderately positive after treatment and remained same during observation.

Table showing treatment with Thio-Sarmine (Brahmachari) intravenously and its effect on Wassermann reaction in 22 Cases.

	No. of injections of each dose.				Total No. of injections.	Total quantity injected in grammes.	Duration of treatment.	Wasserman Reaction.		Periods during which Wassermann reaction was negative and remained so.
	·15	·3	·45	·6				Before treatment.	After treatment.	
Group I.	1	2	3	1	7	2·7	19 days	positive	negative	2 months
	1	1	2	2	6	2·55	18 ,,	,,	,,	2½ ,,
Group II (a)	1	2	2	3	8	3·45	22 ,,	,,	,,	1½ ,,
	1	2	3	2	8	3·3	20 ,,	,,	,,	1½ ,,
(b)	1	2	3	2	8	3·3	22 ,,	,,	,,	2½ ,,
	1	1	3	3	8	3·6	25 ,,	,,	,,	1 ,,
Group III.(a)	1	2	3	2	8	3·3	22 ,,	,,	,,	2½ ,,
(b)	1	2	2	1	6	2·25	16 ,,	,,	,,	1½ ,,
Group IV.	1	1	4	4	10	4·65	34 ,,	,,	moderately positive	
	1	1	4	0	6	2·25	12 ,,	,,	negative	1½ months
	1	2	2	3	8	3·45	22 ,,	,,	,,	1 ,,

OBSERVATION

Thio-Sarmine (Brahmachari) which is sulpharsenobenzene prepared in the Brahmachari Research Institute, Calcutta has been tried by us in different stages of syphilis intravenously in addition to its use by the intramuscular method which has already been reported by the senior writer and co-workers in the Indian Medical Gazette. The specific action of this compound was remarkably manifested after its intravenous use just as is the case of its use by intramuscular method. The constitutional symptoms disappeared and the Wassermann reaction became and remained negative in most of the cases after treatment with this compound. The general health of the patient improved and patient gained in weight. A remarkable point in the use of this compound was that no reactions were manifested after its use by the intravenous method.

Our sincere thanks are again due to DR. U. N. BRAHMACHARI, Physician, Medical College Hospitals, Calcutta (retired), and Professor of Tropical Medicine, Carmichael Medical College, Calcutta, for placing at our disposal the free supply of Thio-Sarmine (Brahmachari) from the Brahmachari Research Institute, Calcutta, for use in the cases of syphilis in the Police Hospital, Calcutta. *

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* Read at the Scientific Section of the IX All-India Medical Conference held at Lucknow, December, 1932.

A Brief Discussion on the Hyperplasia of the Thymus Gland

By D. R. DHAR, M.B., D.T.M. (Cal.). M.R.C.P. (Lond).

Developmentally the thymus is an epithelial structure being derived from the 3rd. visceral cleft mainly. If examined, at its stage of maximum development near about the time of puberty, it is found to consist of two lateral lobes in close contact along the middle line situated partly in the thorax down to the 4th. costal cartilage and partly in the neck reaching up as far as the lower border of the thyroid gland. In the thorax it is situated in the narrow space of the superior mediastinum and rests upon the pericardium and the aortic arch and great vessels. In the neck, the trachea lies directly behind this gland. Besides individual variations the size, and shape of the gland vary according to the age, sex and characteristics of the person. The maximum thickness of the gland under normal condition is about three fourths of a centimeter. The arterial supply is usually from the inferior and superior thyroid arteries.

It was formerly believed that the thymus gland increased in weight from birth only until the end of the second year of life. But HAMMAR [1] showed that the organ reached its maximum weight and size at puberty, and thence gradually atrophied down with the advancement of age. There is not a single gland in the body probably excepting the spleen about the function of which so much difference of opinion exists. According to PARK [3] the gland has got very little functional significance whereas in the other extreme according to SAJOUS [3] Sr., DUSTIN [4], BIEDL [5], HUISKAMP [6], and many others the gland has been endowed with various important functions. They say that the onset of puberty, development of bones, the distribution of phosphorus of the tissues including that in the nerves, storage of zinc and close association with nucleolytic ferments, are dependent on that gland. The extirpation and feeding experiments are not conclusive either. It seems probable that the gland has got some association to the oncoming of puberty, bony changes in the system, nutrition of the nerves, and development in general, specially of the internal organs.

Besides circulatory disturbances, or oedema following acute infections or rarely trauma— in the majority of the cases the enlargement is due to hyperplasia. This hyperplasia has been in some cases compensatory. Infections, intoxications, metabolic disturbances are its main causes. In congenital syphilis and rachitis, thymic hyperplasia has been regarded as compensatory for the splenic fibrosis a common change in the above two diseases. Adenoid and other lymphoid tissue enlargement and specially status lymphaticus are invariably associated with enlarged thymus. In exophthalmic goitre almost always and some times in Addison's disease this gland is hyperplasic. There is a group of investigators who think that thymicolymphatic constitution is somewhat hereditary. Though the hyperplasia has been labelled by some as relative or absolute, it serves no useful purpose from our standpoint.

The effects of definite hyperplasia specially in the thickness of the thymus [7] in the superior mediastinum usually a space of nearly 2 centimeters measured anteroposteriorly bounded by bony walls, is likely to be on the somewhat compressible structures such as the great vessels and specially the trachea.

There are classically three groups of symptoms described and they can be fully and easily explained in the light of pressure on the mediastinal structures as shown above. These are thymic stridor, thymic asthenia and thymic death.

In two of my cases, the X-ray photograph of one of which is shown here, the symptoms were somewhat similar.

This child, whose photograph is shown here first showed symptoms at his 11th. month after measles and influenza. The child, born of healthy parents of well-to-do family, all of a sudden, one

after-noon on slight provocation went off his consciousness with the head thrown back—the face anxious and cyanosed, the extremeties extended and the hands clenched. This alarmed the parents who consulted doctors with all sorts of fancy diagnosis. The child inspite of showing no signs of rickets, and regular exposure to the sun and irradiated remedies being regularly continued, showed no signs of improvement of the chronic bronchitis, probably due to pressure on the trachea. The fits began to get more frequent with the result that one on examining the patient suspected enlarged thymus by percussion and inspection and had the child X-rayed. The diagnosis before X-rays was either hyperplasic thymus or some patent duct some where in some part of the heart. The child is now nearly 2 years old and as expected with the enlargement of the thymus the fits are worse.

In diagnosis suggestions are to be had from auscultation but percussion mainly. Sometimes, and in both of my cases, the manubrium of the sternum appeared a bit raised. The other case was not taken up very seriously because X-rays did not throw any shadow. Then later on, one found in literature that there are many cases of enlarged thymus proved post mortem that have not thrown any shadow on X-ray plates. [8] So negative X-ray finding does not disprove as in my other case the diagnosis of thymic hyperplasia. The diagnosis is possible partly by exclusion and partly by careful analysis of the symptoms and other examinations mentioned above. The characteristic triangular area of dulness on the manubrium with base towards the neck is said to be diagnostic.

There is some difference of opinion as regards the possibility of hyperplasic thymus giving rise to any symptom. But after a careful study of the literature and actual cases one is almost sure about their possibility of manifesting symptoms. Cases of sudden death during the application of chloroform or other anaesthetics or from trivial injury, trauma, shock etc. is genuinely reported and occurs in practice too. There is some hypoplasia of the aorta and blood vessels and the chromaffin system of the body in these cases. These subjects are sometimes of feminine appearance.

Treatment by oral medication in both my cases proved a failure. The first one, a Nepali boy, was successfully treated by a radiologist at Patna. The second case is being treated by all sorts of medicines orally but with the advent of age and as is expected after completion of the second year the gland being enlarged normally the symptoms are getting worse. Deep X-ray therapy is useful but it is difficult to apply in young children. Recently filtered radium is said to have been employed in America with successful results. [9]

In conclusion, I would like to remark that this hyperplasia is not at all so uncommon as one would think it to be. In my talks with medical friends about these cases many facts have been cited which are highly suggestive. We shall be obliged if other experienced colleagues come out with further cases to clear up these somewhat obscure conditions. I hope to be excused for the brevity of my paper but I had to do it from the consideration of time limit even to the exclusion of many important and interesting points. *

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Preparation, Action and uses of Irradiated Ergosterol

By Dr. PANCHANAN BOSE, M.B., (Cal.), M.D. (Berlin)
and
N. K. BASU, M.B.
(From the Research Section of Dr. Bose's Laboratory Ltd., Calcutta).

Introduction

Since the discovery of accessory food factors by Hopkins and their classification into fat soluble A and water soluble B and C vitamins by Mc Collum and his co-workers, attempts have been made by various workers on animal nutrition to study accurately the symptoms and signs resulting from withdrawal, or deficiency of each of the vitamin factors. Thus xerophthalmia and emaciation were observed by Mc Collum and Simmonds to be due to deficiency of fat soluble A from the diet of experimental animals. Eijkman and Funk showed that deficiency of water soluble B was responsible for avian polyneuritis and human beriberi. The deficiency of water soluble C causes scurvy in guinea pigs and in man. Towards the end of the world war Prof. Mellanby was able to show that withdrawal of the fat soluble A from the diet would cause under certain conditions softening of bones in puppies which was recognised on further histological examination to be a condition akin to rickets in human subjects.

Isolation of Vitamin D

In 1921 Prof. McCollum discovered that cod-liver oil was a much better preventive of rickets than butter fat, while both fats were rich in fat soluble A factor. This led scientists to further researches with the object of differentiating between the anti-xerophthalmic and the anti-rachitic factor contained in fat soluble fraction. Drummond tried to isolate the vitamin A factor from the non-saponifiable residue of cod-liver oil and he has been successful in making a very concentrated vitamin A fraction consisting of a lipochrome pigment and an unsaturated complex hydrocarbon which gives a characteristic colour reaction with arsenic or antimony trichloride. Even in this fraction the anti-rachitic factor was also present. It has been however possible to destroy the anti-xerophthalmic factor of cod-liver oil by subjecting it to the action of oxygen at 100°C for periods varying from 12-21 hours. Anti-rachitic factor was however still present in cod-liver oil which has been so treated. This and other experiments showing that anti-rachitic and anti-xerophthalmic factors in various natural fats were present in different proportions prove conclusively the identity of the two different vitamins A and D. Thus 0.1 grm of spinach leaves is sufficient to restore the power of growth of animals kept on a otherwise deficient diet, whereas 3.0 grms will not cure rickets. Cows receiving a diet deficient in fat soluble vitamins will yield milk which will not promote the growth of young animals, but if such a cow be kept in sunlight and open air, its milk is distinctly richer in anti-rachitic value.

Ultra-violet Rays and Vitamin D

The value of exposure to ultra-violet rays in curing rickets in young children was demostrated by Huldchinsky in the same year as the discovery of anti-rachitic vitamin by Mellanby (1919). Thus two contending schools of scientists came forward with their different theories about the causation and prevention of rickets. Hess and Steenbock in trying to solve this riddle fed animals on diet which would otherwise cause rickets in them but which was previously exposed to ultra-violet rays. And they made the startling discovery that diets which had no anti-rachitic power could cure rickets by exposure to ultra-violet rays. Thus the gap between the two theories was successfully bridged.

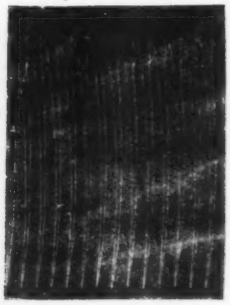
Discovery of Relationship Between Vitamin D and Ergosterol

Now the attention of the workers was drawn to the problem, what is the nature of the substance which is produced in irradiated food

Fig. I

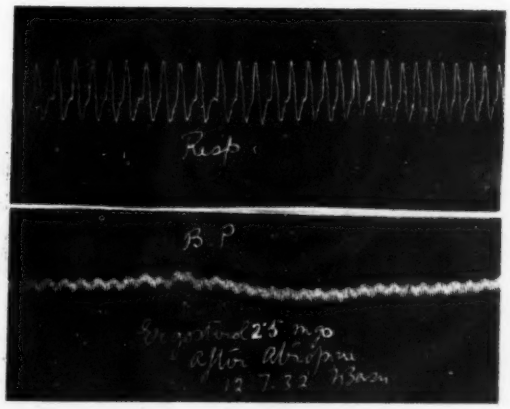
Fig. II

Fig. III



Fi. I—Immediate effect of ergosterol is to depress the heart muscle (Dilution 1 in 1000,000).
Fig. II—Later there is partial heart block.
Fig. III—Slowing of the heart is still persistent after the perfusion of drug has been stopped. At the same time there is some increase in the contraction of the cardiac muscles.

Fig. IV



Note the change in fall of blood pressure after the vagus nerve-endings are paralysed with atropine. (ergosterol. 1 mg. per kg.)

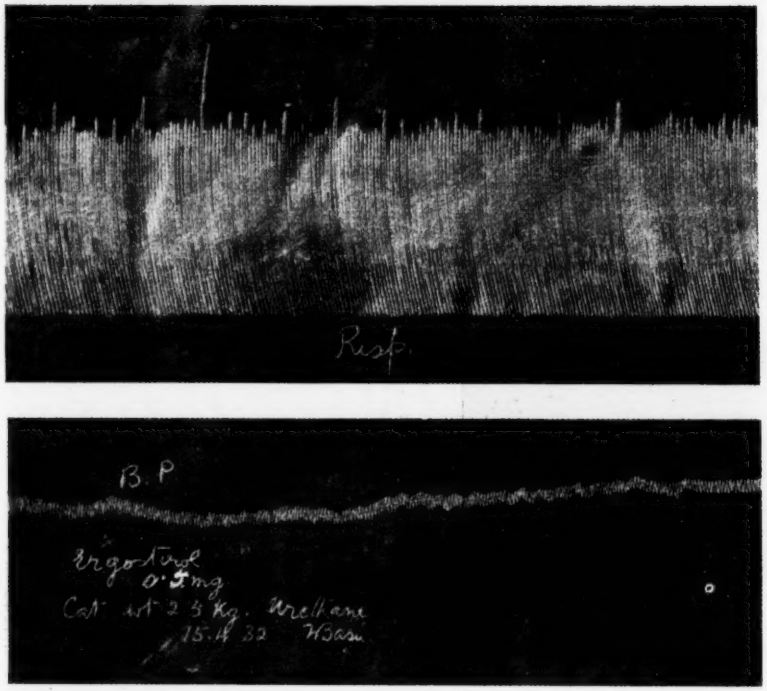
Fig. V

X'Ray photo showing rickets produced in rat with Steenbock's diet.

Fig. VI

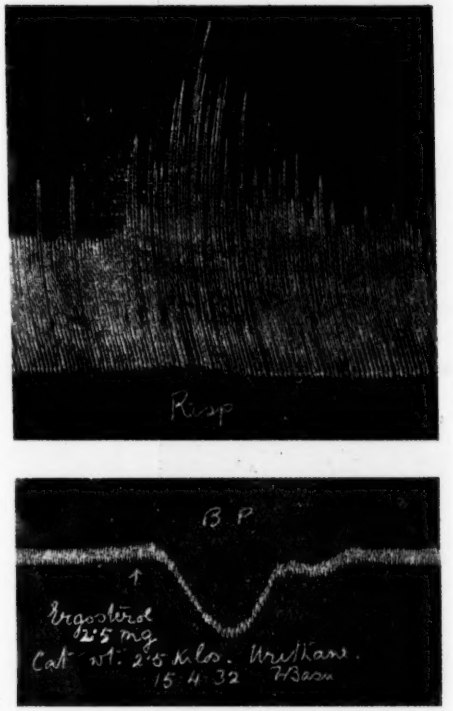
X'Ray photo showing the cure of rickets with irradiated ergosterol (VITASTEROL) prepared in our Lab.

Fig. VII



Note the continued but slight rise of blood pressure after small dose of ergosterol. (0·2 mg. per kg.)

Fig. VIII



Note the fall of blood pressure after big dose of ergosterol. (1 mg. per kg).

stuffs which have the property of curing rickets. Further work showed that though it was possible to induce anti-rachitic properties in foodstuffs and vegetable oil by means of ultra-violet rays, irradiation failed to activate highly purified chemical substances. This led to the idea that some substance must be present in natural foodstuffs and vegetable oils which is activated by irradiation but which is destroyed or lost during the process of purification. Finally it was found that the sterol content particularly cholesterol in animal fats and phytosterol in vegetable fats was responsible for the development of anti-rachitic property after irradiation. Highly purified cholesterol however could not be activated by this means. And it was thus discovered by ROSENHEIM in England and WINDAUS in Germany that an impurity present in cholesterol which has been found to be ergosterol, a complex sterol found in the fungus ergot, was the substance which was really activated into vitamin D by the photo-chemical action of ultra-violet rays. This irradiated ergosterol has been further purified and fractionated by fractional distillation in high vacuum by R. B. BOURDILLON, and a crystalline ester of highest anti-rachitic value, so far obtained, has been recovered from the distillate and provisionally named Calciferol.

PREPARATION OF IRRADIATED ERGOSTEROL

Ergosterol was first obtained by TANRET in 1890 from the fungus ergot. But lately yeast has been found to be the most useful source of this sterol. Subsequent investigations of a large number of sterols and their derivatives from various other sources point to ergosterol as being the specific "pro-vitamin D."

Ergosterol from yeast is obtained by heating it with alcoholic potash and then cooling the filtrate to zero degree when crystals of ergosterol separate out. It is then further purified. This ergosterol is then subjected to ultra-violet irradiation.

Un-irradiated ergosterol gives a colour reaction with chloral hydrate, which appears to ROSENHEIM as specific; but this does not give any reaction with aniline hydrochloride, which reaction is however present after irradiation.

Synthesis of vitamin D from ergosterol is independent of the wave-length of the ultra-violet ray, and it has been found that the maximum potency is obtained after 30 minutes irradiation. Decomposition of vitamin D proceeds simultaneously with its formation when ergosterol is subjected to ultra-violet irradiation, and the maximum potency is attained when 73 per cent of ergosterol is still unchanged.

Ergosterol is insoluble in water and its solubility is increased with other organic solvents.

BIOLOGICAL ASSAY AND POTENCY OF IRRADIATED ERGOSTEROL

Biological methods of assaying irradiated ergosterol depend upon finding the minimum amount of material necessary for curing rickets artificially produced in rats. For this purpose rats of the same age (usually about 4 weeks of age) and of definite weight (between 50 to 60 grms.) are selected and are kept in a dark place. These are fed with STEENBOCK'S anti-rachitic diet and after some time the animals develop rickets which is diagnosed by means of X'Rays. With proper control, the material under investigation is administered to these animals in different proportions and the minimum amount necessary for healing rickets in rats is determined. (vide X'Ray photos : Figs. V and VI).

Anti-rachitic potency of irradiated ergosterol as demonstrated by ROSENHEIM and WEBSTER is between 1/10000 to 1/20000 mg. per diem for rickets developed in rats. DR. KATHARINE COWARD has been able to demonstrate in rats definite calcifying effect of 1/100000 mg. of irradiated ergosterol per diem. Human rickets is rapidly cured by daily doses of 2 to 4 mg. per diem. Irradiated ergosterol is therefore the most potent anti-rachitic substance known, 5 mg. being equivalent to about one litre of good cod-liver oil, so far as its vitamin D content is concerned.

PHARMACOLOGICAL EXPERIMENTS

As many observers have noted abnormal deposit of calcium phosphate throughout the body particularly the vascular

organs, such as the heart, kidneys, lungs etc., after administration of excessive doses of irradiated ergosterol, so we have tried to find out the range between the therapeutic and the toxic dose in animals. We have found that even 100 times of the minimum therapeutic dose of activated ergosterol over long periods showed no unfavourable symptoms in many of the laboratory animals like rats, guinea-pigs and rabbits. With a very big dose (1000 times) there was marked depression noticed in most of the animals which remained in a dull and listless condition, but after 12 hours these animals regained their full activity and liveliness. During this period of depression no change in the force and frequency of the heart beat could be detected. Only the respiration was found to be quickened. Continental workers like PFANNENSTIEL, KREITMAR and MOLL have found that very big doses of highly active preparations continued over long periods were lethal for animals. Death is preceded by loss of weight, loss of appetite, rough fur and sometimes marked diarrhoea.

ACTION ON CIRCULATORY SYSTEM

On perfusion of the frog's heart (1 in 1000,000) there is immediate depression of the muscle, (Fig. I), followed later by partial heart block, (Fig. II) which is not produced, if the heart is atropinised beforehand, thus showing that the irradiated ergosterol stimulates the vagal nerve endings. Another phenomenon which we have observed on perfusion with irradiated ergosterol is that about 15 to 23 minutes after the perfusion with the drug is stopped, partial heart block, initially produced, gradually passes off and the amplitude of the ventricular contraction increases (Fig. III). The contractions of the heart now become regular, slow and more forceful. This is in all probability due to increase of calcium ion concentration in the cardiac muscles. This view is corroborated by our experimental findings of hypercalcæmia in the blood after administration of irradiated ergosterol.

In the cat 1 mg. per kg. produces fall of blood pressure which is however not produced if atropine is injected beforehand (See Fig. IV). This shows that vagal nerve endings are also stimulated by irradiated ergosterol, in case of warm blooded animals. But with 1/5th of the dose which produces fall of blood pressure, (Fig. VIII) (*i. e.* 0.2 mg. per kg.) there is continued but slight rise of blood pressure due probably to the direct stimulating action on the cardiac musculature (Fig. VII).

ACTION ON THE RESPIRATORY SYSTEM

There is increase in the force and amplitude of the respiration in cats, when 1 mg. per kg. is injected. This is, however, not noticed after atropine, thus proving that here also irradiated ergosterol stimulates the vagal nerve endings in the bronchial muscles. But with smaller doses there is practically no action on the respiration.

PLAIN MUSCLES

Isolated plain muscles of the uterus and intestines show some contraction in a dilution of 1 in 250,000 dilution. Such high concentration can however never be reached in the circulation when we consider the minute dose in which irradiated ergosterol is usually prescribed in clinical practice. But so far as the intestines are concerned, it is possible by administration of big doses of highly potent preparations to reach a concentration near about the above dilution. This is probably the explanation of the diarrhoea produced in some individuals by excessive doses of irradiated ergosterol.

BIO-CHEMICAL EXPERIMENTS

We have tried to investigate the effect on the calcium content of the blood after oral, hypodermic and intravenous methods of administering irradiated ergosterol. The following table gives the result we have obtained in our Laboratory.

Analysis of the above results demonstrate the superiority of the oral method of administration to the hypodermic or intravenous methods of administration.

"HESS and LEWIS have reported a hypercalcæmia in one or two rachitic children, treated with moderately large doses. They consider that the effect is produced by stimulation of the

parathyroids by the vitamins." But according to CAMERON "the suggested connection between the vitamin and the parathyroids cannot yet be considered as proved." We, however, believe that there is increased absorption of calcium from the intestines when irradiated ergosterol is administered by the mouth and probably parathyroid stimulation plays a part when vitamin D is injected hypodermically or intravenously. We leave the question open, as we are doing further investigations in order to elucidate the relationship between vitamin D and calcium metabolism.

No.	Animal used.	Wt.	Calcium content of blood. Before	Calcium content of blood. After.	Dose of Irradiated Ergosterol.	Mode of Administration.	Time interval.
1.	Rabbit.	1·2 kg.	10 mg.	15 mg.	1/100 mg.	Per mouth.	6 hrs.
2.	,,	1·4 kg.	12 mg.	17 mg.	,,	,,	,,
3.	,,	1·5 kg.	11·5 mg.	17 mg.	,,	,,	,,
4.	Cat.	2·2 kg.	8 mg.	12 mg.	,,	Intravenous.	15 Mts.
5.	,,	2·5 kg.	10 mg.	14 mg.	,,	,,	20 Mts.
6.	Rabbit.	1·4 kg.	10 mg.	11 mg.	,,	Hypodermic.	4 hrs.
7.	,,	1·5 kg.	12 mg.	12·5 mg.	,,	,,	5 hrs.
8.	,,	·45 kg.	11 mg.	12 mg.	,,	,,	6 hrs.

THERAPEUTIC USES

From the point of view of rational therapeutics, irradiated ergosterol acts almost like a specific in cases of rickets in young children and osteomalacia in elderly persons. Under these conditions there is deficiency in the deposition of calcium phosphate in bones. This deficiency can result from either deficiency of calcium, or of phosphorus, or of the specific anti-rachitic vitamin D. Administration of calcium and phosphorus alone cannot cure this condition in the absence of vitamin D, whereas administration of vitamin D alone cannot cure this condition in the absence of an adequate and balanced supply of calcium and phosphorus. In rickets the calcium circulating in the blood is either normal (10 to 11 mg. per 100 c.c.) or slightly below normal (in cases of rickets with associated tetany) whereas the amount of phosphates which is normally 5 to 6 mg is often diminished to 2 to 3 mgs. Whenever the product of Ca.X P. is below 40, signs of rickets are evident in human beings. If under these conditions irradiated ergosterol is administered then there is healing of rickets with deposition of calcium phosphate in the osteoid tissues which may be corroborated by X'ray examination. This leads us to conclude that irradiated ergosterol can restore the imbalance of calcium and phosphorus in rickets and osteomalacia.

The idea of giving calcium alone for producing calcification in bones thus seems to stand on very weak grounds. What the body requires in conditions of deficient calcification like rickets, osteomalacia, bone tuberculosis, etc., is the balanced supply of calcium and phosphorus ions along with vitamin D or irradiated ergosterol. The vitamin D under these conditions will help the absorption of calcium and phosphorus so that these may be deposited where they are needed in the body.

The common method of administering calcium and parathyroid together in conditions of decalcification cannot be supported as rational therapeutics in the light of recent researches on the action of parathyroid on calcium metabolism. COLLIP (1925) has shown that the injection of parathyroid extract causes a rise of blood calcium in dogs and thereby relieves the symptoms of tetany produced in these animals after operation of parathyroidectomy. This rise in blood calcium could be produced even when the whole of the intestinal tract was removed. From this it follows

that the rise of blood calcium does not result from increased absorption from the alimentary canal. The solution of the problem regarding the origin of hypercalcaemia has been obtained by investigating the cases of Von Recklinghausen's disease which is more commonly known as osteitis fibrosa. This condition has been found to be due to a tumour of the parathyroid glands causing abnormal hypercalcaemia (15 to 20 mg) with increased excretion of calcium in the urine and thus ultimate depletion of calcium reserves in the bones. This condition has been cured by excision of the parathyroids which results in the return of the blood calcium to normal level within 24 hours, with gradual increase of density of the bones as determined by X'rays.

From the above it would be evident that when we want deposition of calcium phosphate in bones or in any desired tissues, as in case of tubercular foci it will be more rational to prescribe irradiated ergosterol instead of parathyroid, for we have seen by X'ray examination that irradiated ergosterol produces calcification in already decalcified osteoid tissue both in experimental animals and human rickets.

Irradiated ergosterol being tasteless and odourless is often more liked by patients than preparations of cod-liver oil. Though, of course, it cannot replace the food value of cod-liver oil, still so far as its vitamin D value is concerned, it is a distinct advance in the line of rational therapeutics. 2 to 4 mgms. per diem rapidly cures human rickets, 5 mg. being equivalent to 1 litre of good cod-liver oil. Prophylactic dose for rickets is 1 to 2 mg. per day. As the over-fed and over-clad children of rich parents often have a tendency to develop rickets, so it is desirable that they should have small doses of irradiated ergosterol added to their usual nourishment. In the rainy season and during the winter the vitamin D content of natural foodstuffs is lower than in summer months, and hence the necessity of adding vitamin D to the diet during these seasons.

MRS. MELLANBY has shown that dental caries is the result of deficiency of vitamin D in the diet. Hence irradiated ergosterol is often given as a prophylactic for dental caries specially during those seasons when sun's rays are not available, as during the rains in our country and during the winter in Europe. It is, however, questionable whether one can disregard the ordinary laws of oral hygiene by laying too much stress on the vitamin factor. Delayed dentition which is usually an early sign of rickets can be prevented by timely administration of irradiated ergosterol.

Deficiency of vitamin D in the diet of the expectant mother often leads to faulty skeletal development of the young child. A liberal supply of irradiated ergosterol in the diet of the expectant mothers will not only improve the health of the offspring but prevent tooth troubles and other vaso-motor disturbances, as a result of calcium, phosphorus and vitamin deficiency in the mother.

In all conditions due to calcium deficiency in the body, for example, angioneurotic oedema, tetany and certain skin disorders associated with irritability of the nerves, it would be advisable to combine irradiated ergosterol with calcium in order to promote the absorption of calcium from the intestines.

In pulmonary tuberculosis, we think the indiscriminate use of calcium and vitamin has led to the negligence of other approved methods of of treatment with rest, fresh air, good food etc., A costly medicine can never take the place of wholesome nourishing food and good hygiene. Of course there can be no harm in giving a combination of minerals and irradiated ergosterol by mouth with the idea of maintaining a constant supply of the vital minerals in the body, so that when by the heightened resistance of the individual, the activity of the tubercular focus is extinguished, the process of repair can take place with the help of these minerals. In cases of tuberculosis of bones, glands etc., where heliotherapy has demonstrated its efficacy, the administration of irradiated ergosterol can be considered as a sort of substitute when arrangements for heliotherapy are not within the access of the patients.

Oral administration of vitamin D is to be preferred to hypodermic injections, as DRUMMOND has shown and we have been also able to confirm in our Laboratory that the latter mode of administration is inferior to oral administration.

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Problem of Filariasis in our Country

By KALIGATI BANERJI, M. B.,

Suri, Birbhum.

Wide is the field of filarial investigation. But few are the workers therein and they too are of great diversity in training and outlook. The extent and many-sidedness of the problem render its presentation a matter of considerable difficulty. We are still too much in dark with regard to pathogenesis and cure of filariasis. The mighty Elephant of Truth stands unexplored and we, like the blind fellows in the fable, feel its legs and declare them to be mighty pillars, or its ears and take them to be mighty fans, each thinking alike that he is nearest to the Truth.

HISTORY OF FILARIASIS IN OLD AYURVEDA

Before the advent of mosquito and filariasis in the history of medical science the disease was known all through India as is evident from the history of cases of adenitis, pain, fever and swelling just as in elephantoid fever in our days. Elephantiasis of legs was said to be the most common. And it concurs with modern statistics. But the old authors were not blind to the fact that elephantiasis occurred in hands, ears, legs, penis and scrotum, nose and lips.

"यः सज्वरो वह्मगजो भृशर्त्तिः
शोथो नृणां पादगतः क्रमेण
तत् श्लीपं ब्यात् करकर्णनेत्र
शिश्नौष्ठनासास्वपि केचिदाहुः" ।

But we can't follow when elephantiasis is said to be of different varieties.

It may be that they could see difference in the filarial elephantoid swelling as to (*i*) its softness (*ii*) colour (*iii*) inflammatory nature. They might have been wrong in their classification—but this speaks of deeper insight of their clinical eye. And we may gain—somewhat in finding out a true cure for each and every case—if we can select one group of cases from another and vary our treatment accordingly.

Problems that arise in connection :—In my article on Filarial Periodicity in March, 1930, in the Indian Medical Gazette I wrote that there are certain obscure points about the manifestations of filariasis which require to be answered. More points of enquiry here come to the field.

1. The relationship of filarial periodicity to the lunar cycle occurs in about 70% of cases :—COL. ACTON and DR. RAO tell that it is probably a question of periodicity in giving birth to the larvae by the adult gravid female worm—the birth of larvae being accompanied by ejection of toxin which causes the fever. They are silent about the fact why 8th. and 11th. days of the lunar cycle and new moon and full moon are favourable for periodic attacks. Perhaps at these periods—the body immunity is at a low ebb or the tissue fluids are in a condition favourable for the microfilariae to invade the peripheral circulation. Herein comes our submission to Kaviraji theory of humour.

2. Why is it that in different individuals different parts of the system—legs, arms, genitals and breasts are affected : of course in my district affection of

legs ...	...	63%
genitals (male) ...	...	20%
arms...	...	9%
breasts	...	10%
other parts	...	1%

But there is a combination of affection of legs, and hands, legs and genitals, hands and genitals. The commonest is combination of legs and genitals.

It may be that lymphangitis starts when the patient is devitalised—when trauma or infection occurs. But this does not apply in all cases.

3. Are cases of idiopathic hydrocele, without any manifestation of filariasis and without any other obvious cause, due to filariasis ? In my article on "Etiology of Hydrocele in the Tropics" in Medical Review of Reviews I have pointed out that in my district filarial infection accounts

for about 60% of so-called hydrocele of no obvious cause.

4. Why do some cases have attacks of erysipelas, pyaemia and septicaemia ?

If secondary sepsis be a factor in elephantoid fever or if streptococci cause the manifestations of filariasis—how can we explain the septicaemic type of filariasis where no streptococci or any other secondary organism can be found by blood-culture nor in every case microfilaria is detected ?

5. Why one form of treatment is not suitable to all ? And why the same form does not give a "permanent" cure ? Is there any specific treatment ? Or is there any hope of finding out a specific remedy ?

6. It is claimed that typhoid cures filarial infection and hence the origin of typhoid vaccine by DR. BANERJEE as a treatment of filariasis. The more recent claim is made by one prominent doctor that malarial serum is a cure for filarial infection. It is based on the assumption that filarial patients seldom get malaria. There is no reason why filarial patients won't get typhoid or malaria. Moreover typhoid attack is seldom found to cure a person of his filariasis. Thirdly, typhoid vaccine is seldom the permanent cure of filariasis. If it is a cure, it is a cure of the few and that for several years only. In the recent epidemic of malaria in our district we saw at least 2 dozens of filarial patients suffering from malaria. Next instances are on record when malarial parasites and microfilaria are found in the same film. If malarial serum and typhoid vaccine are claimed to be cure they act no better than protein-shock.

7. Can there be any sure laboratory method of diagnosing filariasis ? In all cases of filarial infection, even in cases of so-called filarial septicaemia, M. filariae can't be detected in the blood. Is there any cultural method of diagnosing filariasis, Or is there any other way of laboratory diagnosis of filariasis in the absence of microfilaria in blood and consequent eosinophilia, when there are clinical evidences of filariasis ?

8. If secondary cocci cause the so-called filarial manifestations, can the phenomenon of kataphylaxis as put forward by Acton and Rao explain every manifestation of filariasis ? They say that (1) a septic focus can always be found from which we can recover a pyogenic coccus (2) The irritation produced by the worm causes a total breakdown of the tissue defence mechanism (Kataphylaxis). These sites form a suitable nidus for lodgement of these cocci, (3) The same coccus can be recovered from inflammatory site as from the septic focus. (4) It can be recovered from urine also, showing it must have invaded blood-stream. Eradication of the septic focus followed by immunisation prevents periodic attack. But there are certain points against this theory.

(1) In the site of attack, secondary organisms can't be always found.

(2) Vaccine made from the organisms in the septic focus of a patient can't give permanent cure in filariasis in all cases.

(3) Some cases are seen—as in chyluria with M.f in peripheral blood and no other manifestation—where no secondary focus can be detected even.

(4) When a filarial site becomes attacked with erysipelas, the strepto-erysipelas must be autogenous—which is next to impossibility.

(5) Granting that cocci, or any intestinal infections have a great role in manifestation of filarial lymphangitis, how is it that the manifestation occurs without any certainty. In one case attack may occur twice or thrice within a whole year—in other it occurs twice or thrice in one month while both of them may have same secondary sepsis to the same extent.

How can the problems be solved: Official workers in Tropical medicine paid little attention to the question of Filariasis so long. Very few patients can go to Calcutta to see them for thorough investigation. The non-official workers can't do anything towards research work—espe-

cially in mofussil towns he is cabinned, cribbed and confined at every step. Moreover here more importance is attached to what comes from official institutions. Our duty lies in establishing a central filarial commission with branch organisations in epidemic parts of India. These will investigate into (1) Prevention (2) Clinical investigation of varied manifestation (3) Pathological data in each and every case. (4) Curative treatment (5) Statistics unless the Indian Medical Association lays its hand in such important questions. We have to rely on Canadians and Londoners for gospels on filariasis. We know how little clinical material they get.

Pathogenesis

The Pathogenesis of filariasis is a mystery.

Whether there is toxin of filaria—great doubt exists. Acton and Rao are of opinion that "The micro-filariae have to penetrate first through the superficial and then the deeper lymphatic channels and glands to reach the large lymphatics at the back of thorax and abdomen. They may be arrested as they are developing in transit through the lymphatic channels at different levels of the chain. Should they penetrate to the big lymphatic channels and attain maturity and give rise to embryos, the famale when laying embryos will pour forth her toxin and this will give rise to re-actionary eosinophilia in the blood-stream, on the other hand should semi-developed filariae be arrested in the lymph channels and glands on their way to large lymphantic channels they can't mature—they are incapable of proceeding to sexual maturity, do not produce larvae hence no M.f are found in the blood of such patients. That the toxin is liberated is shown by (1) eosinophilia (2) allergic symptoms—urticaria-periodic headache, slight rise of temperature (3) irritation and subsequent changes in the tissues brought about by the worm. But there is one school which believes that micro-filariae have no toxin and toxin of streptococci running in the sheath is responsible for all the troubles. Acton and Rao can't tell us about the nature of toxin, nor could isolate the toxin or tell us what is the true anti-toxin. If filariae have toxin why do we see cases of patients with microfilaria in blood but without any symptom—'fever' or lymphangitis ? Moreover, eosinophilia is not the true test of toxin, but it is but the revolt of the system against some protein-complex for which liver is primarily responsible. Time may come when culture of microfilariae may yield a toxin like coccal group and we can then find out a chemo-therapy or anti-toxin.

Toxin may be due to groups of streptococci running in the sheath of micro-filariae. In the chronic hydrocele sac, Col. Connor demonstrated in some cases—short-chained streptococci with micro-filariae. He can't tell us where they get these streptococci. Nor chemicals that are toxic for streptococci can destroy the sheath of micro-filaria nor anti-streptococcal remedies endow the patients with permanent cure.

Next comes the question of kataphylaxis. We won't go in detail about it as Acton and Rao have done much work in this connection and every body is versed with their idea more or less. But the primary filarial infections with rigor, vomiting and fever with eosinophilia have the nature of anaphylaxis, not kataphylaxis and this allergical state manifests itself when body-immunity is at a low ebb, and when there is stasis of liver, the main anti-toxic agent of the body.

Filarial periodicity is eventually produced in one of two ways. Firstly there may be a fixed population of microfilariae within the body, which shelter in the internal viscera during the day time, and only enter the peripheral circulation at night. According to Manson "The deeper parts where they retire are the larger blood vessels, particularly arteries ; they mostly lodge in the blood vessels of the lungs." If this is true, at postmortem examination one would expect to find many more microfilariae in the lungs of patients who died during the day time than in those who die at night ; but this is not the case.

The other possibility is lodgement of the microfilariae in the large blood vessels during the day time. It is difficult however to imagine

how this occurs, and FULLEBORN has found microfilariae in myriads in the circulating blood within the heart at post-mortem examination.

FULLEBORN holds that, together with the contraction of the superficial blood capillaries at night, the larvae take up a slightly bent attitude, and are thus retained during the daytime in the deeper capillaries and pre-capillaries, but that in shed blood this bent attitude is not shown.

MANSON failed to find microfilariae in two cases where blood was aspirated by the spleen puncture. Yet if microfilariae are not present in the deeper organs during the day time, how are we to explain their presence in such organs at post-mortem examination ?

Other workers state that filarial periodicity is an expression of periodicity on the part of the gravid female F. bancrofti in giving birth to her larvae. But if the microfilariae are absent from the internal viscera during the daytime, then there must be an enormous daily destruction of them. MANSON gives the following observations on three-hourly findings in a patient followed up for six consecutive nights and days as to the number of microfilariae present in a blood smear 1½ by 1 inch in size, and in the deposit from one ounce of chylous urine from a case. The actual number of microfilariae present were as follows :—

Time	6 a.m.	9 a.m.	Mid-day	6 p.m.	9 p.m.	Mid-night	3 a.m.
Blood ...	0	0	0	1	62	50	10
Urine ...	7	36	43	24	26	28	34

The chart swows that the urinary periodicity is entirely different from the blood periodicity.

This shows that the filarial embryos are constantly passing to the lymph stream, and the figures in the table do not give their true incidence in the lymph. MANSON-BAHR observes that multitudes of microfilariae die or are cut off from the main blood stream by inflammatory blockage. He also found that they did not live at body temparature in citrated blood for more than 12 hours, but in citrated blood at room temperature they survived for three days. Now, if microfilariae are short-lived how are they disposed of ? There are two possibilities. (*i*) MEYER in China reports that death and dissolution of the microfilariae occurs in the plasma, and is more rapid in the morning than in the evening blood. Perhaps, just as there is a lyzozyme in tears which has a bactericidal property, so perhaps, there exists in the blood some substance lethal to microfilariae. (*ii*) RODENWALDT implicated the renal medulla as a veritable burying ground of microfilariae. ANDERSON found dead microfilariae in process of dissolution in the liver, spleen, and lymph glands.

To sum up, the microfilariae perish rapidly within the blood stream, while the filarial periodicity is the result of cyclical parturition, and is adapted to the habits of the transmitting mosquito host.

ATYPICAL CASES OP FILARIASIS

I need not dwell at large on typical cases of filariasis. But several interesting cases which are seen from time to time are reported. (1) *Lymph scrotum* with lymphorrhoea all the year round or with lymphorrhoea during febrile attack is a common variety. ACTON'S and RAO'S idea that radical operation for hydrocele is responsible for the product of lymph scrotum is untenable. Lymph scrotum is never an artificial formation as result of trauma.

(2) *Acute filarial orchitis without any fever*, often misleads the clinicians. And I know of two cases where stragulation of hernia was diagnosed for acuteness of pain around the cord and testes.

(3) *Elephantiasis of buttock :*

A Hindu male aged 30—a chronic filarial subject—had an attack of orchitis as usual. The orchitis was developed on the right side. The orchitis subsided but within a week there was pain in the right buttock with swelling which grew chronic. There was no leucocytosis. But the patient was given a course of strepto-staphylo vaccine and his swelling was much reduced.

Pyaemia : A Hindu male aged 45—a chronic filarial subject—had filarial lymphangitis of the right leg at the top of his inguinal adenitis and filarial orchitis. His orchitis and adenitis subsided but intense pain started in the leg

which suppurated. Inspite of the draining he developed pyaemic abscesses in the back, thigh, and axilla. He was given antistrepto-serum and antistaphylo-serum, aolan, pyaemic vaccine but his temperature went on for about 6 weeks and he had nephritis and anaemia. Ultimately he was saved however.

A Hindu male aged 28—a filarial subject with elephantiasis of leg and scrotum—in course of one elephantoid fever had severe colic in abdomen which made him unconscious. He had temperature ranging from 103 to 105 and was fully off his senses for a week when abscesses were detected over elephantiasis of leg and all over the body. They were operated and he was cured ultimately with autovaccine.

We have seen three more cases of this type. But wonder of all was that antivaccine or streptostaphylo vaccine had not been able to free them from filarial fever.

Nervous manifestations : Neuritis of peripheral nerves often occurs in course of filarial fever. Probably it is due to affection of lymphatics supplying the sheath.

(*a*) A Mahomedan female aged 42—a subject to filariasis—had elephantiasis of leg. She developed extreme pain at the site of facial nerve outside stylomastoid foraman which gave rise to paralysis. All these symptoms occurred in course of a typical filarial febrile attack. Soon she developed typical peroneal paralysis of the leg where she had 'elephantiasis.'

(*b*) Chronic headache in absence of filarial fever in a filarial subject is often seen.

(*c*) A Hindu female aged 26, with a history of chronic filariasis and elephantiasis of the right leg. One night she had a typical attack of filarial fever with pain and increased swelling of the leg. On the second day she developed diarrhoea and after five or six stools collapsed. Stimulants were administered and she recovered and the fever subsided within three days. She however developed a staccato speech and nodding movements of the head. The tremors were involuntary, could not be checked and occurred two or three times a second. They were also visible in the outstretched hands and in the tongue. The knee jerks were exaggerated. She was treated with calcium and parathyroid extract and luminal for a week and the tremors disappeared. Are these nervous manifestations due to inflammation of the neurolymphatics of the corpus striatum or its vessels ?

(*d*) A Hindu male adult, a sufferer from chronic filariasis developed wry neck pain in one of his usual attacks of fever. There were no enlarged glands palpable in the neck nor any other sign of local inflammation.

Urticaria along with filarial febrile attack was seen in two cases. And in two cases it was controlled with saline purge and soamine injection.

Leukoderma :—Leukodermic patches are quite common more on elephantoid scrotum and elephantoid leg. These are due to (1) adrenal deficiency consequent on chronic filariasis (2) Nutritional deficiency of the skin consequent on lymphatic stasis.

Pigmentation :—Pigmentation occurs in the chronic elephantoid masses. Perhaps it is due to destruction of trophic nerve fibres, their nutrition being cut off by hypertrophy of the skin and blockage of lymphatics. Folliculitis eczema are quite common over the elephantoid masses.

Erysipelas is quite common complication ; synovitis and arthritis are also seen. I know of a case where synovitis of knee joint developed after filarial orchitis and the patient died from septicaemia, his knee suppurated. The patient was free from any venereal trouble.

Arthritis often manifests itself before the fever and often prolongs the fever. Bigger joints are affected. We can seldom see polyarthritis. Knee is most affected, then the shoulder and then the wrist.

Ectodermal trophic changes :—There are seen some patients where along with the fever, nails get brittle and ridges are formed when with a course of soamine they get relief from filarial fever for a year or so ; their nails get all right simultaneously.

Carcinoma:—It is easy to understand how carcinoma may invade tissue involved in filarial elephantiasis for (1) there is chronic irritation of the part (2) there is poverty of the lymph supply due to blockage of lymphatics by dead filarial or by invasion with secondary organisms.

Case 1.—A Mahomedan female a nullipara, aged 28, a widow who had had elephantiasis of her right breast with enlargement of the right axillary glands for some ten years. She gradually developed a hardness in the tumour of the breast with increase in its weight and excruciating pain. On examination, the mass was found to be of stony hardness with the right axillary glands also of stony hardness and with solid swelling of the right arm. The case was an inoperable one and the patient died from cachexia and septic fever; a few months before death there developed a typical malignant ulcer over the affected breast.

Case 2.—A Hindu female aged 44 multipara, had filarial elephantisis of the right breast since the age of 18. She consulted no one until increasing pain and heaviness in the breast made it certain that the condition had become malignant. She succumbed inspite of the amputation of the right breast and radio-therapy.

Case 3.—A Hindu male aged 40 developed cancer penis at the top of elephantisis.

Filarial colic:—This is a condition where the patient after or during a typical attack of filarial fever, complains of extreme pain in either (1) right or left iliac fossa (2) the epigastric region (3) right or left kidney region—while there are often vomiting, chill and fever. Such cases are often mistaken for those of appendicular, gastric, renal or intestinal colic. After a few hours the pain may spontaneously disappear. The following are illustrative cases.

Case 1.—A Hindu male aged 48 with filarial history—one night suddenly got unconscious when going to latrine. He smarted under extreme pain. His B. P. was normal, there was no temperature and we could come to a diagnosis when we cathetered his bladder for diagnostic specimen of urine. We got hemochylous urine and he got back his senses. It was vesical pain.

Case 2.—A Hindu male aged 30 was suddenly seized on the 11th night of the lunar cycle with intense colicky pain in the left iliac fossa and vomiting. He soon became unconscious with pyrexia. Next morning the pain abated, but the fever lasted 72 hours. The next time he had a similar attack with orchitis on the right side in addition. Microfilariae in blood clinched the diagnosis.

Case 3.—An Anglo-Indian female aged about48, was admitted to the gynaecological department of M. C. H. Calcutta for (1) dull pain in the left loin often giving rise to a pain of colicky nature with vomiting (2) hectic type of fever. At first sight, the case was taken to be one of pelvic trouble. When referred to the medical side, the case was taken to be one of renal colic, but radiography showed nothing abnormal. Finally, one night she developed high fever when her blood film showed microfilariae. A course of I. V. soamine relieved her of all symptoms. This colic is due to inflammation of perirenal lymphatics.

Filarial diarrhoea:—Often occurs after a febrile attack. It is due to rupture of intestinal lymphatics or inflammation.

Jaundice:—Often occurs due to stasis and inflammation of biliary lymphatics.

Septicaemia:—Two types are often seen—fatal and acute type; mild and chronic type. In the first type the patient a filarial subject gets typical high filarial fever with coma or delirium and succumbs within a few hours inspite of antistrepto-serum or intravenous arsenic. In the second type the filarial subject starts with usual lymphangitis or with abscess; but is not freed of fever. These patients run a remittent or intermittent temperature varying from 99 to 101 but never go fatal.

The following four cases are illustrative of acute fatal filarial septicaemia.

Case 1.—A Hindu widow aged 54 was a sufferer from chronic filariaris with elephantiasis of both legs. On the 11th day of a lunar period

I saw her when she was suffering from an intense attack of fever, with a temperature of 105° F. There was intense pain, with redness and swelling, in the left breast. The left axillary glands also were enlarged. Within four hours she developed coma and delirium. The urine was free from albumin and sugar. I gave a subcutaneous injection of 12 cgms. of sulfarsenol, but she sucumbed within 24 hours.

Case 2. A Hindu male aged 48, had an elephantoid scrotum for many years. As usual, one night he had fever with rigors, intense pain, redness and swelling in the scrotum. Coma and delirium developed within a few hours of the onset of the attack and he died within 48 hours.

Case 3. A Hindu male aged 24 had suffered from filariasis for one year. There was a right sided hydrocele with swelling and tenderness of the right inguinal glands. He used to have an attack once a month, lasting for 24 to 36 hours, the attacks beginning with chill and rigor. There were inflamed red streaks along the anterior aspect of the right thigh (imflamed lymphatic channels.) The patient was conscious but passed several stools with blood and mucus in them. The parents had no idea of the gravity of the case. The patient passed half a dozen such stools and then collapsed and died, without medical assistance having been summoned.

Case 4. An up-country man aged 38 was brought to the medical college hospital with coma, generalized lymphadenitis, and high fever. The case was suspected to be one of plague but examination of blood films and of gland puncture films showed myriads of microfilariae. After injection of salines etc. this patient recovered.

Atypical filarial abscess—Perisplenic abscess, perirenal abscess, parietal abscess of the chest are often seen. All these cases were filarial subjects. Along with usual filarial lymphangitis in the usual places these start pain and swelling in their usual sites. And in one perisplenic abscess and perirenal abscess dead filariae were demonstrated.

Afebrile filariasis—Textbooks on tropical medicine do not often draw attention to afebrile infections with F. Bancrofti but such cases are not uncommon. One may have myriads of microfilariae in blood but there may be no manifestation. But it is strange how there can be lymphangitis or solid oedema without any fever. The three following may be cited as examples.

Case 1. A Hindu lawyer aged 32 complained of a painful swelling in the left calf almost every 8th day of the lunar month. The swelling was tender to the touch and used to persist on each occasion for three or four days. There was no pyrexia at all. His grand mother is a sufferer from chronic filariasis with elephantiasis of the legs. The patient's symptoms were cured by six graduated injections of typhoid vaccine.

Case 2. A Hindu male aged 12 complained of gradual swelling of the left foot with pain in the calves. The swelling grew in size at each full moon period and when first seen he had had three such periodical recurrences. The left inguinal glands were enlarged. There had never been any fever during the four months the condition had persisted. No microfilariae could be found in his blood film but the eosinophil count was 7 per cent.

Case 3. A Hindu male aged 48 had his first attack associated with funiculitis and orchitis. Double sided hydrocele developed, but there was no recurrence of the funiculitis or lymphadenitis. The patient however, suffers still from typical filarial fever off and on and his blood films give positive findings.

Recently I have seen a case of filariasis where petechial haemorrhage occurred with arthritis of big joints and elephantiasis of secrotum and penis.

Filariasis and other diseases :—Malaria is often associated with filariasis. These cases are most refractory to treatment and often these cases run on to suppuration probably due to devitalised condition of the body.

Pregnancy and filariasis :—Mastitis is often commoner complication during pregnancy, and child birth. Chyluria also occurred in some

cases. Low septicaemic type of filarial fever occurs after an attack of mastitis complicating puerperium in a few cases. We have often met with difficulties in conducting labour of patient with elephantoid vulva.

Venereal disease and fllariasis :—Suppuration is generally the rule in those cases. And these cases of filariasis are most chronic, most troublesome.

Diabetes and fllariasis :—A diabetic patient with filariasis starts cellulitis or gangrene on the slightest provocation.

Enteric infection :—We have seen filariasis in two boys at the top of enteric infection. There was generalised infection of glands all over the body with higher rise of temperature. In both these cases either of the parents had elephantiasis and microfilariae were detected per blood and antistrepto-serum cured the fever and generalised adenitis.

Lung disease and filariasis :—Asthma and chronic bronchitis have been found in some cases of filariasis. Is it due to lymphatic infiltration of lung capillaries with microfilaria or anaphylaxis ? Mechanical or Biochenical ? But I have seen not a single case of T. B. of lung in a filarial patient or a filarial patient dying of T. B. lung. But much work remains to be done on the subject before we can dogmatise on it.

Leprosy and filariasis.—Leprosy on a elephantoid mass is not rare in our district.

Treatment

We are struck with reverence to our old Aurvedic scholars when we come to discuss the treatment. We may profit by their experience if we can chalk out new open tracks in their line. Of course we can't have any science in them whenever they advise pricking of ears in elephantiasis of scrotum but their treatment was directed to external application and internal medication and bleeding of parts. We have not come to any definite conclusion about different counter-irritants they used and suitable cases for their application and action. As to oral therapy, they eulogise "शाखोट," "ताम्बुलपवार्ना कल्क," "हरिद्रा," पुनरणवा, विकला, पिपुल, हरीतकी to be fried in castor oil, juice of 'Natakaranjapatra' (नाटाकरञ्जपत्र) mixed wito oil sinapis, 'Bridlatdarak churna' (ब्रह्मदारकचूर्ण) root of 'Godhabatimool' (गोधावतीमूल) with 'Masendari' (Maskalai), (माषेमुरी = मासकलाई) 'Gulancha', root of Nim, catachu, 'pipul', 'Bach', (बच) pine, 'Punarnava', 'Belchhal' (बेलछाल) urine of cow, all these alone or in combination are said to be cures of filarial fever. 'Nityanandaras' (नित्यानन्दरस) which is known as panacea of filariasis is said to contain colloid mercury, copper iron along with Pipul, 'Teuric (तेउडी, चितामूल) itamul etc. The principle of treatmenties in (1) Elimination through bowels and kidneys (2) Bitter drugs.

Coming to modern idea of treatment the principle lies at curing the condition under which filariasis occurs :—(1) Curing of secondary sepsis (2) Curing of intestinal stasis. But apart from these we are looking forward to a method which will kill the audult filaria in deep lymphatics. We are now at a stage when we can check the parturition process of the audult filaria. But to all intents and purposes we can not reach deep lymphatics through circulation. Hence no drug when injected can reach the adult mothers. We must be in search of a drug by mouth which can reach the thoracic duct just as fat is absorbed by that route. We still use quinine, arsenic, iron, by mouth to fight filariasis after purging our patients though there is little the rationale except in purgation. But my own experience has taught me that colloid ferro-arseno-manganese (Crooke's) has once checked two cases of chyluria and stopped filarial fever in two cases for a year or so. Ext. Lodh Liq. is still the sheet anchor of some practitioners in cases of chyluria. Homeopaths claim to cure some cases by hydrocotile asiastica, and Indian drug 'Mandukaparni' (मण्डुकपर्णी) the extract of which was useful to check the filarial fever of two of my cases. But more remains to be done in this line and in my opinion if any colloid metal preparation can be made to be absorbed via lymphatic system we can find a real therapy of filariasis.

Then comes injection therapy. First is arsenic. Soamine sub-cutaneous has been used for long. It can reduce the number of M.f in blood and check eosinophilia. But permanent cure is unknown. Of course intravenous soamin has given more lasting cure and that too in few cases. Then N. A. B. was thought to be specific. Next sulfarsenol is claimed to be the remedy for the filarial infection. But they have no advantages over soamin. Of course these are found to be useful in cases complicated with syphilis and in very few of the ordinary cases. Arsenic may rob the attacks of their terrors though permanent cure is unknown. Tryparsamide is the hobby of the practitioners in cases of chyluria. But they can not assign any reason why it should have superiority over N. A. B. or soamin, intravenous. Dangers of its use should be uppermost in every mind. And I have seen its failure in at least 5 of my chyluria cases. Moreover in some cases where it was used

Fig. I
24 hours after injection.

Fig. II
72 hours after injection.

Fig. III
96 hours after injection.

Fig. IV
6th day after injection.

the attack of chyluria recurred. Hence perpanent cure is unkown. Recently O'Connor has eulogised that sulfarsphenamine injected locally into the elephantoid mass reduces the swelling. I once attempted it but the pain at the site is horrible and the American drug is quite unsuitable for the tropics.

Next comes antimony. S. A. T., ureastibamine or neostibosan are used. In some cases it reduces the swelling of the elephantoid mass, in very few cases where arsenic has failed it may check fever. It is found to reduce the microfilariae of peripheral blood. We can't call it more useful than arsenic.

Last comes nonspecific protein therapy. Under it comes typhoid vaccine, streptostaphylo vaccine, auto-vaccine, arseno-typhoid etc. Of course cure is more lasting under the last. All act more or less as protein shock. Strepto-staphylo vaccine is more useful in cases where there is secondary sepsis due to (1) pyorrhoea (2) boils, and other skin diseases. But greatest benefit and more permanent effect so far have been obtained by a combination of arseno-typhoid and strepto-staphylo vaccine. Recently Calcutta Research has put in the market a combination of arseno-typhoid and streptococci and in my opinion it may be of greater use. More recently claim has been made that malarial serum gives more lasting benefit to filarial patients and decreases the growth of elephantoid mass. But we don't know why it should be more beneficial than vaccine.

A preliminary note on the Behaviour of Plant Tissue Towards Bacterial proteins and Lipoids

By H. GHOSH, M.B.,

Director, Biological Laboratory, Bengal Chemical, Calcutta.

and

MR. SAROJ KUMAR BOSE.

Asst. Bacteriologist.

Since 1924 we have been trying to find out a suitable plant to study the response of plant tissue to bacterial bodies. After an attempt on different plants we have been able to select a plant on which we have made some experiment which may be of interest to workers on this line.

We have selected a plant called in vernacular '*Ghritakumari*' ; in sanskrit 'Kumaree' ; in Hindi 'Ghikanvar ; in English 'Aloin Barbadensis' : natural order Liliacæe.

The leaves of this plant are very thick containing a large quantity of mucilagenous substance. This plant has been found to be an ideal one for experimental studies.

After injecting 1 C.C. of bacterial emulsion (about 2000 mill. per .CC.) of B. Coli and B. Typhosus—we could not find any trace of microbial body in smear of juice taken from the site of injection after 48 to 96 hours. It was evident from repeated experiments that some substance was produced which brought complete lysis of the bacterial bobies. This seems to be due to some proteolytic ferment secreted by the plant tissue after introduction of the microbial bodies, because fresh untreated juice taken out of the leaf has got no proteolytic property. We have not yet finished the study of the nature of this proteolytic ferment. But the most interesting of these observations was the behaviour of the plant tissue towards B. Tuberculosis. We found that after injecting into the leaf an emulsion of B. Tuberculosis cultured on glycerine agar—the acid-fast character of the bacilli gradually disappeared and on the 6th. day there was no more acid-fast character of the bacilli, though the outline of the micro-organisms stained with methylene blue could be distinguished. The coloured figures illustrate the effect precisely. So long as the acid-fastness existed we were able to culture them back from the plant tissue juice but were unable to get any growth after the acid-fast character had disappeared.

The conclusion which could be deduced from this observation was that the plant tissue most probably secretes a lipase which can dissolve the waxy coat of the tubercle bacillus rendering the bacilli non-acid fast. We have repeated the experiment several times and obtained the same result. We are studying the character of the juice after inoculating with different microbial body and it is yet too early to say anything further.

SUMMARY

The plant tissue secretes a proteolytic as well as a lipolytic ferment on introduction of bacterial body and these ferments gradually dissolve the bacteria.

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Editorial Comments

Non-Surgical treatment of Peptic ulcer

Accurate data regarding the results of non-surgical management of peptic ulcer are difficult to obtain. One of the chief reasons of this difficulty is that we are not possessed of any means of estimating a patient's natural tendency to heal. It may be assumed that the so called cure of an ulcer may have resulted spontaneously irrespective of the non-surgical regime. That spontaneous healing is possible is proved by the autopsy records of European and American pathologists on patients, who were subjects of chronic dyspepsia but were never aware of any ulcer during life time. But such cases of healed ulcers seem to be comparatively rare in Bengal as is evident from the autopsy records of the various Calcutta hospitals. The important point to be kept in mind is that there are several causes of ulcer and several types of the disease as have been rightly pointed out by Alvarez. It is really surprising that the diffuse inflammation and ulceration of the mucous membrane of the distal end of the stomach associated with duodenal ulcer, as is seen in Germany and Austria, is very rare in our country.

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About 80 per cent of the cases of peptic ulcer are cured or markedly improved by medical treatment, as have been reported by many authorities FRIEDENWALD, SIPPY and more recently R. BROWN, F. SMITHIES and a host of others.

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The successful medical treatment of ulcer consists in removing the exciting causes and helping the natural restorative power of the tissues. In the past medical treatment has been unsuccessful because it was generally discontinued immediately on the relief of symptoms, which as we know, from radiological findings, occurs long before the healing is complete. The modern development of the medical treatment of peptic ulcer is due to LEUBE and SIPPY. It is essential at first to eradicate as completely as possible all *foci* of infection. The teeth, gums, chronic nasal and nasopharyngeal catarrh should be treated by appropriate measures. The appendix should be removed if there is any evidence of chronic appendicitis and recent observations have shown that it is necessary to examine the prostate of men with ulcer. As tobacco, alcohol and coffee are very important accessory factors in the pathogenesis of ulcer, they should be stopped during the treatment and restricted markedly later on. Fatigue is also an important accessory factor in the development of an ulcer by increasing the acidity of blood and tissues, which according to BALINT is present in patients with ulcers and interferes with the healing. Further the restricted diet during the treatment is quite insufficient for considerable activity and so rest is a very important factor in the treatment of ulcers.

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The regulation of diet is of prime importance in the treatment of peptic ulcer. The patient should avoid any article of food which would tend to cause physical irritation in the stomach. The diet should produce as little secretion of acid as possible or render it innocuous by combining with it. It should also contain nothing which can irritate the ulcerated mucous membrane either mechanically or chemically but it must be sufficient in calorific value and in vitamins. Milk and very soft boiled rice have given very excellent results in our hands in this country. A pinch of sodium citrate is generally added to milk when it is administered alone. In order to make the treatment less monotonous, arrowroot, cream of potato and other non-irritating and nutritious food can be substituted. Soft fruits such as bananas, ripe bael etc., may be allowed. LENHARTZ diet or

any other diet with more protein is not suitable for our country as the people are accustomed normally to low protein intake. Some fresh butter may be administered with advantage.

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The presence of free hydrochloric acid is responsible for the development of an ulcer. The value of alkalis in neutralising this free acid has long been observed though to SIPPY belongs the credit of first pointing out that an ulcer could usually be cured by administering sufficient alkali to keep the stomach contents alkaline for weeks. Many have objected to the use of large doses of alkali as it prevents gastric digestion but now we knowthat the mechanical function of the stomach is more important than its digestive fuction and the intestinal digestion is not appreciably impaired if the gastric digestion is cut away. The importance of controlling nocturnal secretions of acid was advocated by SIPPY and sufficient alkali must be administered to prevent the presence of free hydrochloric acid in the stomach. The alkali, which has given excellent results in our hands is a mixture of

Magnesium oxide Gr. X.
Calcium carbonate Gr. X.
Bismuth oxycarbonate Gr. V.

This powder is administered for 4 doses regularly after meals and the last one at 10 P. M. Pain usually disappears within a few days and the patient feels quite comfortable. It is advisable to warn the patient to take another dose of the powder if he wakes up at night with a feeling of discomfort. Though it is best to have the patient in bed during the early stages of treatment, we have found excellent results by treating patients from the out-patients department. Magnesium oxide has been found very useful at relieving constipation is an associated condition in the majority of the cases and the proportion of magnesium oxide and bismuth oxycarbonate may be conveniently altered to avoid constipation or a too free bowel movement. Where cramps of the pylorus play an important part, a combination of atropin and papaverin is very useful. We have also found very good results by the systematic use of atropin gr. 1/200 and papaverin gr. ½ twice in the form of a pill 15 minutes to half an hour before meals twice a day. This good effect of atropin has been ascribed by C. V. NOORDEN to a decrease in hydrochloric acid secretion, tonicity and peristalsis namely the motility of the antrum, while its action on the cramps of the pylorus is very uncertain. This atropin and papaverin may be continued for some weeks in the treatment of peptic ulcer. As many patients with ulcer belong to spasmophilic vasoneurotic type, so along with atropin and papaverin, luminal in doses of gr. 1 or gr. 1½ in the evening may be used as a sedative but opium should be administered with great caution as pointed by NOORDEN.

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We have no experience with the non-specific protein therapy or X-ray treatment of peptic ulcer and we commend these new lines of treatment to our readers who may study teeir eficacy in our country.

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In discussing the relative merits of the surgical and medical treatment of gastric and duodenal ulcers, HURST writes "the after-results of both are found excellent in a large majority of cases. Whereas the immediate mortality of medical treatment is nil, that of surgical treatment, specially of gastric ulcer by partial gastrectomy, is by no means negligible. The recurrence of ulceration after adequate medical treatment is no more common than the development of an anastomotic ulcer and the occasional recurrence or absence of healing of the primary ulcer, and that medicine can produce as complete and as lasting a cure as surgery.

Medical News and Notes

[Items of news and notes of general interest to the profession for incorporation in this section from the members of the profession will be greatly appreciated—EDITOR]

Memorial to a Popular Medical Officer. On March 14 last, SIR T. VIJAYARAGHAVA CHARIAR laid the foundation-stone of the Combes Operation Theatre in the Sirkar State Hospital at Kunnamkulam, Cochin, in memory of the late Chief Medical Officer, DR. G. N. COMBES. In course of his address Sir Vijayaraghava paid a glowing tribute to the memory of DR. COMBES who was associated with him in an official capacity for three years. It was announced at the meeting that a Combes Memorial Fund had been opened at the request of RAO SAHEB K. J. GUNA PAI who contributed Rs. 240 and DR. RAO Rs. 500. The form of the memorial would be decided by a committee of subscribers.

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Lady Tata Scholarship for Research in Blood-diseases. The late SIR DORABJI TATA founded a Trust Fund of the value of Rs. 25 lakhs, in April, 1932, as a memorial to his wife, in order to promote the advancement of medicine by research into the diseases of the blood, with special reference to the leukaemias. A fifth of the net income of the Fund is ear-marked for the encouragement of research by Indians in India or abroad by the award of one or more prizes annually for the best work done in any scientific investigation which has bearing directly or indirectly on the alleviation of human suffering. The rest of the income will be devoted towards research in diseases of the blood, with special reference to the leukaemias, by the award of prizes, scholarships, Fellowships or grant-in-aid of such work and the awards will be open to candidates of any nationality including Indians.

It is now announced that four Scholarships of the value of £400 a year each, will be open for award in June, 1933 to men or women of any nationality for research work in the subject of blood diseases, with special reference to leukaemias. Each will be tenable for a year, from the October 1, 1933, and renewable up to a normal maximum tenure of three years. The Scholarships will be ordinarily awarded on a whole time basis, but a candidate holding a part time teaching post may be allowed to retain it if his duties do not prevent him from giving his chief interest and energies to his proposed research work.

The applications, containing the applicants' name, age, sex, nationality and qualifications together with the proposed line of research and the methods to be used, the Institute or Laboratory in which this is to be done, and the Director who will supervise it must reach, before April 15 next, either the Secretary, Lady Tata Memorial Trust, Capel House, New Board Street. London E. C. 2. or the Secretary, Lady Tata Memorial Trust, Bombay House, Fort, Bombay, from whom forms of applications may be obtained.

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Post-Graduate Training in Germany. The Hon. Secretary, Indian Institute of Die Deutsche Akademie, announces the following stipends for higher medical training in institutions of higher training in Germany, available for Indian scholars (male or female) for the academic year of 1933-34 :

1. Berlin : An Indian physician for practical training in St. Hedwig's Hospital, Berlin. He will be taken as a Volunteer Assistant. The candidate must be a graduate of a Medical College (M.B.) with hospital experience in India. He will receive free board with the hospital staff.

2. Hamburg : One stipend at the University of Hamburg, consisting of free tuition and a pocket-money of R. M. 30 (thirty marks) per month. The candidate will be given free private coaching in the German language.

These stipends are tenable provisionally for two academic semesters only. The first semester begins early in November 1933 ; and the second semester ends in July 1934.

Applicants must be graduates of recognised Indian Universities, preferably scholars possessing research experience ; must possess good health and supply at least two recommendations from professors or Indian public men, about his career and character. The applicant should also have fair knowledge of the German language.

It is imperative that a stipend-holder should arrive at Munich by the 1st of September and stay in the city at his own cost till the academic year begins in November, devoting these weeks to intensive study of German language course for foreigners at the University of Munich, where he will be exempted from tution fee.

Apart from the stipend, the stipend-holder must be prepared to spend at least R. M. 100 per month for the necessary expenses not included in the different stipends.

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Andhra Medical Conference. The third Andhra Medical Conference is to be held at Guntur on the 17th. and 18th. of April. In addition to the usual business of discussing the welfare of the medical practitioners in Andhra Desa, it has been arranged to have a number of interesting papers by medical men of standing, as well as demonstrations of interesting clinical cases.

Arrangements are being made for an exhibi-

tion of medical and surgical appliances and drugs during the Conference. The exhibition will be open from the 16th. to 29th. April and will be in two sections, Indian and non-Indian.

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Problem of Medical Relief in Bengal. The Hon. Minister-in-charge of Health and Sanitation made the following remarks, while performing the opening ceremony of the new Hospital block of the Calcutta Medical Institute, on the 17th February last: "Qualified medical attendance is still one of our greatest problems. In the year 1930-31 there were only a little over 7,500 registered medical practitioners in Bengal, including men possessing the minimum qualification for registration; that is, we had only one qualified medical medical man for every 7,000 of the population.

"This figure is by itself conclusive proof of the necessity of further expansion of medical education. But there can be no justification for training these medical students at State expense or with the help of private benefection unless they agree to settle in the village. Even taking that 50 per cent of these medical men live in villages, we have only one qualified medical man for every 24 villages; so there is yet a good field for these sub-assistant surgeons in the mofussil. Unfortunately they prefer Government service or service under local bodies and are the least inclined to try their luck in the rural area.

"In the public health units alone the Government now employ about 500 health inspectors, who are paid Rs. 50 and to 1000 per month. If these qualified medical men take public health training, I am sure, they can prove more useful, provided they agree to work seriously as sanitary assistants. If the financial position of the province improves, antimalarial operations on a much wider scale will be taken up which will require the services of a large number of medical men. We must train them up in anticipation of future need of the province."

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Hospital Fund Race. It is understood that collections in connection with the Hospital Fund race, run in Bombay on March 15, total Rs. 70,000. Under the present circumstances this sum will be a source of considerable relief to the depleted funds of the hospitals in the city.

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Anti-Tuberculosis Propaganda in Mysore. In addressing the meeting held at Bangalore on February 10 last to consider the scheme of work to be followed by the Anti-Tuberculosis Sub-Committee of the Mysore State Branch of the Indian Red Cross Society, DR. A. R. MEHTA, Organising Secretary, King George Thanksgiving (Anti-Tuberculosis) Fund dealt briefly with the aims and objects of the Fund—its origin and the manner in which it was to be spent. The corpus of the fund amounted to about Rs. 9½ lakhs, the interest of which nearly Rs, 50,000 was resolved to be annually spent, in the first instance, for prevention of tuberculosis in India. The policy was to distribute this amount to several provincial sub-committees asking them to carry on an intensive propaganda agaist tuberculosis. Any small grant that the provincial Sub-Committee received had to be supplemented by donations raised locally. The Headquarters Committee decided that with their limited resources all that was possible was to carry on an intensive propaganda against tuberculosis, dispelling ignorance among the masses in regard to the causation of the disease.

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Campaign against Tuberculosis in Nizam's Dominions. Tuberculosis is very widely prevalent in Hyderabad City owing chiefly to the local conditions of living. The medical department of H. E. H. the Nizam's Government has for sometime past been contemplating the best methods of affording treatment to the poorer class of patients who can ill-afford to travel to Madanapalli in the Cuddapah District. A comprehensive scheme for fighting the disease successfully has now been formulated. A clinic has recently been opened in the Beroone-Balda Hospital, where advice is given about the mode of living and information supplied as to special institutions where they could undergo treatment. Infectious cases, however, are kept and treated in special airy wards in the Isolation Hospital. Sanction has been given for the construction of special airy wards in the Osmania General Hospital, and arrangements to construct a sanatorium, for which land has been selected and surveyed, are in progress.

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Tuberculosis Association of Bengal. The Governor of Bengal presided at the annual meetings of the Tuberculosis Association of Bengal held on March 10, 1933. The Governor offered to contribute Rs. 100 for each life member up to a total of ten secured by the Association in 1933 and, as a result of this three gentlemen present offered to become life members paying Rs. 100 each.

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A new Charitable Eye Hospital. LALA KISHANLAL JALAN, a resident of Bhiwani and a millionaire of Bombay, has established a charitable eye-hospital at Bhiwani, equipped with up-to-date instruments applicances. The opening ceremony was performed by DR. FARRER of the Farrer Mission Hospital, Bhiwani, in February last.

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New Hospital at Lahore. H. E. LADY WILLINGDON opened on March 11, the Lady Willingdon Hospital for women.

As the existing hospitals were insufficient and unable to cope effectively with the day to day demand for the treatment of women patients, the present Hospital has been constructed at a cost of Rs. 7,74,000 excluding electric arrangements and medical equipment which have cost another four lakhs. The hospital is self-contained regarding irrigation, water supply, etc. and there are arrangements to cool the rooms in summer, and heat them during winter. There are three wards of 12 beds each for Indian and European patients, besides observation rooms and a septic-case ward.

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A New Calcutta Hospital. Calcutta is the proud possesor of another big modern hospital, a fine four-storeyed building built at a cost of about three lacs and twenty-five thousand rupees.

The largest share of this cost has come from the Calcutta Corporation which has made a grant of rupees one lac and twenty thousand. The Government of Bengal has contributed Rs. 25,000 and has promised a further grant of the same amount. The rest of the funds has been contributed by public bodies, private individuals and members of the teaching staff and students of the Institute. MR. GIRINDRANATH ROY has made the princely donation of Rs. 50,000 towards the maintenance and upkeep of the hospital in memory of his late-lamented father MR. MOHENDRANATH ROY and a ward in the hospital, containing about 40 beds, has been named "Mahendranath Roy Ward."

The hospital contains 100 beds and would have to be maintained at a recurring expenditure of about Rs. 70,000 per year. It is one of the hospitals attached to the Calcutta Medical Institute, a non-official teaching institutions affiliated with the State Medical Faculty of Bengal.

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Claims & Needs of Ayurveda. The first convocation of the Government Ayurvedic School, Patna was held on the 18th. February last under the presidency of the Hon'ble Raja Bahadur of Kanika, the Finance Member of the B. O Government. Mahamohopadhya Kaviraj GANANATH SEN Saraswati ; MA., L.M.S. delivered the Convocation oration. The learned Mahamohopadhya referred to the past glory and recent achievements of Ayurveda as well as its present needs. Among other things he said, "Ayurveda has her specialists and her voluminous literatures in every branch of practice just as we now have them in Western Medicines. Of these there are evidences intrinsic and extrinsic. A gleam of past history in the ages long forgotten, say during the great war of Mahabharat, will testify to the fact that Ayurveda was in vigorous youth capable of effectively meeting all demands upon it, medical and surgical. For many a long century after this the light of Ayurveda shone upon all contemporary civilisation and such civilised countries as Egypt and Arabia, Rome and Greece, China and Western Asia."

He added that the recent progress in Ayurveda was the result of an all-India effort of Indians themselves and the sympathetic treatment from at least three provincial Governments. Continuing he said, "I do not hesitate to assert that Ayurveda has many things to give to the Western World. I confess in the same breath that it has many things to take from the West, things which have been lost, and things which are coming into being as recent scientific advances."

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Girl with temperature of 110°. A 20 years old Mexican girl has amazed doctors at the Los Angeles General Hospital by remaining alive with a temperature of 110 degrees. It is reported that almost every day for three months her temperature has been higher than that ever previously recorded in a human subject.

Specialists who have examined the girl have concluded that a tubercular tumour in the third ventricle of the brain where the "heat centre" is located is responsible for this unusually high temperature.

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Health Flights for Sick. News comes from Paris that a French aviation company provides health flights for sick peple. Patients who avail themselves of this new treatment are flown to high altitudes in a special plane where they can breathe pure air. It is claimed that cold and whooping coughs can be cured by this method. According to the French Academy of Science the average person breathes air which is contaminated with soot, sulphuric acid, dust and minerals. These good-air baptisms are claimed to bring people far above the noxious air of the city into a health giving atmosphere.

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Air Transport of Patients. Transport of the sick by aeroplane is becoming a regular feature of the Australian outback, and in Queensland a regular aeroplane medical service has long been in operation. It is almost a common thing for a specialist to travel 400 or 500 miles by aeroplane, and recently a Sydney doctor travelled 1400 miles by aeroplane to Mount Isa to attend a sick woman. The longest of these journeys was probably in 1900, when an aeroplane was engaged by the Australian Inland Mission to bring a patient from Port Darwin to Sydney, a distance of nearly 2000 miles.

Medical Associations, Societies, etc.

Medical Societies, Associations, Unions etc. are invited to make use of this Section of the Journal. —EDITOR.

All India Medical Licentiates' Association

POONA BRANCH.

A meeting of the above Association was held on Sunday the 12th Feb., 1933, with DR. TENDULKAR in the chair.

DR. V. D. SATHAYE narrated his impression on the last Madras Conference. He also outlined the business working of the Association in various provinces.

In Madras, and in the Northern part of India, he said, the licentiates as a class were better organised and so were able to secure more privileges and held a better position in their practice.

The immediate demands of the Association were calculated to be as under :

(1) Inclusion in the proposed Indian Medical Council on an equal footing.

(2) Raising up the course of the Licentiates to 5 years all over India.

(3) Eligibility for appointment as Honoraries at the civil hospitals.

As regards work in Bombay the lecturer said that they must carry on an intensive propaganda to get the Constitutions of the Bombay Medical Council and the College of Physicians and Surgeons, Bombay, radically altered so that the licentiates would get adequate representation on the Managing Council of the latter body. In conclusion he appealed to the members to help in organizing the class in the Bombay presidency.

The following resolutions were also passed at the meeting :

1. This meeting is of opinion that the present constitution of the Bombay Medical Council is undemocratic and the same should be altered on the following lines :
   (*a*) The principle of nominations be stopped forthwith.
   (*b*) The present divisions in the Register be abolished and a uniform list of registered medical practitioners be maintained.
   (*c*) Elections to the Medical Council be made by general election.
2. This meeting resolves that the Government should define a clear policy regarding honorary appointments at the civil hospitals and resolves that these appointment should be given on the basis of experience and expert knowledge and possession of mere foreign degrees and diplomas should not be a necessary criterion in giving these appointments ; this meeting further resolves that members of the Licentiate class should be eligible for appointment to these posts.
3. This meeting resolves that the Constitution of the College of Physicians and Surgeons, Bombay, be radically altered so that the Licentiates who form the bulk of the constituents of that body be given full representation in the managing council so that the interests and grievances of this class will be properly attended to.
4. This meeting resolves that Hon. Junior House appointments at the civil hospitals attached to medical institutions coaching up the Licentiates should be reserved exclusively for this class and an adequate number of these posts should also be given to Licentiates in other non-teaching civil hospitals.

Bombay Medical Council

The following is a summary of the proceedings of the Bombay Medical Council held on the 6th February, 1933.

1. Mr. MANGALDAS V. MEHTA, O.B.E., L.M.S., M.R.C.P., F.R.C.P., F.C.P.S., who was elected a Member of the Council in place of the late MR. R. N. RANINA, L.M.S., was introduced to the Members.

2. The Council resumed consideration of the case of MR. P. V. THARANI, a registered medical practitioner, who was charged with carrying on practice in Karachi in association with an unqualified person in contravention of rule 1 clause (b) of the Code of Medical Ethics and paragraph 2 of the Warning Notice and who was already warned by the Council that he should sever his connection with the unqualified person so far as medical practice was concerned, and resolved to erase his name from the Register.

3. The Council then considered an application from Mr. P. K. HODIWALA, M.B.,B.S., for restoration of his name to the Register stating that his name was removed in 1931 for giving untrue certificates, and that he was experiencing great hardship since the removal of his name. The Council resolved that his name should now be restored to the Register.

4. The Council resolved to amend rule 3 of part II of the Code of Medical Ethics to the effect that—

No registered medical practitioner should meet in consultation any practitioner who does not hold a registrable qualification or whose name has been removed from the Register by order of the Council for infamous conduct in a professional respect.

5. The following six members were elected to constitute the Executive Committee for the year 1933 :

SIR TEMULJI B. NARIMAN, KT., The Hon'ble SIR NASARVANJI CHOKSY, KT., C.I.E., DR. G. V. DESHMUKH, DR. RAJABALLY PATEL, MAJOR W. C. SPACKMAN, I.M.S., and DR. D. A. D'MONTE.

Godavari Medical Association

DR. B. V. VARADACHARI, B.A., M.B. C.M. of Rajahmundry presided over the first meeting of the Godavari District Medical Association held

in the Amalapuram Government Hospital premises on the 11th instant. Interesting cases were exhibited by DR. A. PERI SASTRI and DR. REDDI of Amalapuram, general discussions on diagnosis and treatment followed. DR. VARADACHARI read a paper on pernicious anaemia and severe secondary anaemia due to chronic intestinal amoebiasis.

Tanuku Medical Association

A meeting of the Tanuku Medical Association was held on Sunday, the 26th. February at Duma at the residence of DR. D. SEETHA RAMIAH, L. M. P. Rural Medical Practitioner of the place with DR. T. BHASKAVARAO, L. M. & S. in the chair.

DR. G. SIVARAM, M.B. & B.S., continued his discourse on the principles of Ayurvedic system of medicine and discussions were held on interesting cases treated by some of the members.

After music and light refreshments the meeting came to a close with a vote of thanks to the host.

Association Notes

Memorandum of the Indian Medical Association on the Proposed Indian Medical Council Bill.

This Bill to establish a Medical Council in India is the outcome of a great deal of discussion and agitation in the past. It was brought to a head by the decision of the British General Medical Council to withdraw their recognition of Indian Medical degrees, in consequence of which a Conference of Provincial representatives was held in 1930, which, after condemning the action of the General Medical Council decided that we should set about putting our own house in order. It was felt that, with a view to establishing a uniform minimum standard of medical education in India, it was necessary to form an Indian Medical Council. It is necessary to recall these facts because to no small extent has the attitude of the General Medical Council governed the provisions of this Bill. A reference to the covering letter of MR. REID makes it clear that one of the reasons for the introduction of this Bill is to safeguard the "international status of Indian Medical degrees which has been endangered by the action of the General Medical Council."

Before proceeding to a consideration of the merits of the Bill, it is necessary at the outset to view the measure in the light of present and impending circumstances. The provinces of India have reached different stages of development from the point of view of provision of medical education, relief and prevention of diseases. It is difficult to foresee what attitude the province will take and what would be the position of an All-India Medical Council, under the new constitution. Under the Federal Governments of both Australia and Canada, each constituent province regulates its own medical policy and it is not unlikely that the same attitude would be adopted by the provinces in India under the Federal Government. The position of the Indian States must also be taken into consideration. In these circumstances therefore, the Bill is to a large extent premature. It would be futile to make an enactment which would, at no distant date, have to be entirely overhauled. This fact needs to be kept prominently in mind and if, in spite of this fact, Government persist in introducing the Bill then it ought to be framed as far as possible in the light of what the control and powers the impending constitutional reforms would be given to the provinces. It is only on this understanding that the Indian Medical Association desires to discuse the details of the Bill.

At this juncture, however, we should remark that in a measure so far-reaching in its effects and which has a technical and special aspect namely the interest of the medical profession in India, the Assembly should have the advantage of expert opinion on the subject—opinion that has the confidence of the great body of the medical profession whose interests are concerned. We, therefore, submit that to the Select Committee should be nominated a competent member of the independent Indian medical profession and one who has the confidence of the profession to represent their views.

If we are to have an All-India Medical Council it is advisable that this Council should be comprehensive and not restrictive in its scope. The preamble however limits the Bill to a very narrow channel, namely the maintenance of registration of the "higher" grade of the qualified practitioners in order to establish a uniform minimum standard of "higher" qualifications in medicine for all provinces. The qualification "higher" is not only vague but such a qualification was not contemplated either in the previous draft Bill or at the Inter-Universities Conference. Thereby the largest section of Indian medical practitioners (about 30,000 in number) is excluded. Furthermore, the Bill offers little or no incentive for doctors to place their names on the proposed All-India Medical Register. Unlike other countries in which privileges and immunities are allowed

to medical men this Bill entirely omits reference to them and gives nothing in return except perhaps a vague and problematical prestige, for a not inconsiderable registration fee. It gives nothing more than what registration under the existing provincial Councils of Medical Registration now provides. There being a reciprocal relationship between the various provinces, a practitioner now registered in any one province is free to practise in any other province.

Apart from the scope of the Bill, we would ask what is the real purpose of the measure. If it is to place our own house in order, to improve the standards of medical education in India and to conduct our medical policy in a satisfactory manner, the intention is laudatory and not one at which we would cavil; but if the intention is to effect any of these things merely in order to placate the British General Medical Council then we would point out that there is much ground for objection, quite apart from any question of sentiment. Unfortunately, the Government's action and statements lead us to infer that the real intention is to placate the General Medical Council and we should be at some pains to point out how unnecessary this is. In the first place, we can put our own house in order quite independently of the General Medical Council. In the second place, we have to study the interests of the overwhelming number of practitioners in India before the interests of the few scores of men who proceed abroad for medical training, particularly to the United Kingdom. In the third place, those who proceed to the United Kingdom in order to graduate find no difficulty within a short time of arrival in qualifying under the Conjoint Boards in England and thereby obtaining recognition by the General Medical Council. Lastly, it might be remarked that an increasing number of Indian students are proceeding to Continental countries where they are given every encouragement and facility and are even provided with scholarships. The language difficulty is overcome by the fact that lectures, as in Vienna, are delivered in several languages, and in fact some of them have adopted English as the medium of instruction. If, also, it is thought that to bring the licentiates within the scope of the Bill would jeopardise the chances of recognition of Indian medical degrees by the General Medical Council, we submit that the interests of these 30,000 medical practitioners are more important than the regaining of recognition by this British Institution.

All these facts have to do with the question of reciprocity and we would consider it an insult to the dignity of this country if, in the consideration of reciprocity, the Indian Medical Council occupied an inferior or subordinate status to that of any foreign medical body. For this reason we assert that, as a matter of principle, it is for the Council upon formation to negotiate reciprocal relationships and it is a negation of this principle to give British medical degrees automatic recognition such as is attempted in the Second Schedule of this Bill. This principle would be present even if the British General Medical Council had not withdrawn its recognition of Indian medical degrees but the fact that it has done so only serves to emphasise the principle.

Apart from these wider issues, the *composition of the proposed Council* is an important matter. We have remarked above that the spirit of the new reforms should be maintained and that the Council should be a popular body composed, for the most part, of elected members. For this reason we deprecate the suggested composition which gives an almost preponderating element of official representation. Not only is the President to be nominated, not only are Local Governments to nominate a member each but also three members are to be nominated by the Governor-General in Council, while, even in regard to the members elected by the Medical Faculties it should be remembered that these Faculties have in them a large official element which would ensure the return of an official or one who is officially persona grata. As against all these, the provincial Committees are allowed to elect only one representative each and it has to be remembered that in the provinces of Assam and Central Provinces there would be no provincial committee in view of the non-existence of provincial medical council. The principle of this composition is entirely wrong. The larger interests of the bulk of the Medical profession are overlooked while all Government interests are strongly fortified. We do not suggest that both the Central and Provincial Governments are not interested parties, particularly from the financial standpoint; but this in itself is not sufficient reason to give them such overwhelming power as against the weightier interests of the medical profession as a whole. For example, in the British General Medical Council some forty five of the members are elected to represent the profession and only five are nominated by the Privy Council as representing Government's interests. The same principle is applicable here. If the Provincial Governments are entitled to representation because of their financial interests, the Corporations of cities like Calcutta and Bombay might with equal right ask to be represented, for they make large donations to medical education and institutions.

Lastly there is the question of the licentiates, who have been trained under the western system of medicine and are recognised as qualified practitioners in India and to whom we have already referred above. We do not see that the inclusion of the licentiates would in any way

defeat the objects or purpose of the Bill, in fact their exclusion would place out of the fold the bulk of the medical profession in India which would be a fact to be highly deprecated. We have already dealt with their claim from the point of the General Medical Council though we would add that if a four-year course of medical training in Japan suffices to gain the General Medical Council's recognition there is no reason why Indian licentiates should not be similarly recognised. As a matter of fact Madras has already decided to introduce a five-year course while the U. P. and Bengal have recommended its adoption. We believe that the inclusion of licentiates in the Central Register would lead to a bettering of their training and status and we do not believe that the medical interests of the people would be adversely affected by such improvement in their status. The question of fees depends largely on the capacity of the people to pay and the relation between supply and demand of practitioners with the result no practitioner could put his fees beyond the economic capacity of the people. There would be no greater tendency towards overcrowding in towns than is present to-day. One of the main reasons why we object to the exclusion of the licentiates is that it makes an invidious distinction in the ranks of the medical profession in India and also because their exclusion contradicts to no small extent the intention of the Bill to establish a uniform minimum standard of qualifications in medicine for all provinces. As we have suggested before, the restriction of uniformity to "higher" qualifications alone is not warranted.

We sincerely hope that the Government will give due and close consideration to the various points we raise. It would be impolitic to force through a measure that has no popular support in which case it would be sure to be altered out of all recognition with the establishment of the more liberal constitution resulting from the Round Table Conference. A statemanlike view is called for and we hope the Government will rise to the occasion.

Indian Medical Association.

(BOMBAY BRANCH)

It has been arranged that series of clinical lectures will be delivered under the auspices of the Branch. The following is a programme of the lecture series for the month of March :

(1) Wednesday, the 15th March, 1933. "Clinical interpretation of some laboratory tests." By DR. V. R. KHANOLKAR. M. D. (Lond).

(2) Friday, the 17th March, 1933. "Some Heroes and Martyrs of Medicine." By DR. A. S. ERULKAR. M. D. (Lond).

(3) Thursday, the 23rd March, 1933. "Midwifery in Bombay." By DR. HERCULANO DIAGO DESA. M. D. (Bom)

(4) Tuesday, the 28th March, 1933. "History of Medicine." By DR. G. V. DESHMUKH. M. D. (Lond).

Book Reviews

Bed-Side Medicine. *A Hand-book of Medical Diagnosis—Symptoms, Physical signs, and Laboratory methods from Tropical Standpoint.—By Akhil Ranjan Majumdar, M.B., Second Edition, Calcutta. The Book Company Limited. 1930. ; pp. xi+584 ; Price Rs. 7-8.*

The author's experience as a teacher and examiner enabled him to gather what were the difficulties of Indian students in bed-side practice and to publish in 1928 a short hand-book on clinical medicine from the Tropical point of view to supplement the usual text books. The reception accorded to this handy work has led to the publication of a second edition just after two years in which a large amount of new matters has been added. Into the 567 pages of text he has packed a wealth of information which will prove of great value to the readers. There is much more, however, than clinical medicine in this book and as stated in the preface, no pains have been spared to make it a convenient, hand-book of all informations that a medical student or a busy practitioner may require for his routine bed-side work. We might venture to appeal for a revision of the sections on kala-azar and physical signs of early pulmonary tuberculosis in the next edition. *H. G.*

Modern Pharmacology and Therapeutic Guide including Materia Medica, Pharmacy, Incompatibles, Indian Poison Act of 1919 and 'Invalid Food Recipes'.—*By Akhil Ranjan Majumdar, M.B., Second Edition, Calcutta. The Book Company Limited, 1930 ; pp. 596 plus appendix xxx ; Price Rs. 5.*

The author intended this book to be stepping-stone to the more detailed study of Pharmacology and the demand for a new issue in about a year's time is an evidence of its popularity. The publication of the new Pharmacopoeia will necessitate drastic revision when we hope the text will be brought thoroughly to date. *H. G.*

Mysore Medical Association, 4th Annual Conference, Proceeding.—*Demy 8 vo, pages xii + 251.*

A neatly got up volume of 251 pages. Apart from the Presidential address and the address of the three presidents of the three sections—Medical, Surgical and Health—the volume contains 14, 16 and 11 papers in the medical, surgical and Health sections respectively. The variety of subjects dealt with in the various sections does credit to the organisers of the Conference. It is regrettable that these papers could not have a wider publicity by being printed in the various medical papers of the country. We hope in future the authorities would see to this. *A. N. G.*

Current Medical Literature

MEDICINE

Oral administration of Metaphen in the treatment of Gastric and Duodenal Ulcers

C. M. TRIPPE (Ann. Int. Med. 1, 901, 1933) recommends metaphen in 1: 500 solution orally to patients with symptoms of chronic abdominal distress in the dose of 4 c.c. three times a day with gratifying results.

Metaphen is an organic mercurial compound and possesses according to RAIZISS greater germicidal properties than mercuric chloride.

The material presented includes an analysis of 82 cases, 26 gastric and 56 duodenal ulcers and relief from pain was obtained in practically all cases in an average of three days' time.

No toxic effects were ever observed and complete disappearance of gastric and duodenal ulcers consequent upon treatment with metaphen has been demostrated by X-ray studies.

He suggests that the action of metaphen, primarily a bactericidal agent, may be in the part played by infection in the evolution of ulcers. *J.N.D.*

Simple achlorhydric anaemia

N. ROSENTHAL and H. A. ABEL (Bull N. Y. Aca. Med. IX. 1: 15 Jan. 1933) describes that (1) Simple achlorhydric anaemia is a syndrome which occurs most frequently in middle-aged women.

(2) The anaemia is characterized by microcytosis and low color index.

(3) Iron deficiency is probably the underlying factor in the development of the anaemia and iron ammonium citrate, saccharated carbonate of iron, reduced iron and Blauds' pill have been used with equally favourable results.

(4) Certain conditions may be contributory to the development or aggravation of the anaemia, such as, uterine haemorrhage, haemorrhoids, intestinal infestations and nutritional disturbances.

(5) Adequate doses of inorganic (reduced iron 30 grains daily) usually act as a specific. *J. N. D.*

Gastro-intestinal manifestation of allergy

R. A. COOKE (Bull N. Y. Aca. Med. IX. 1. 15 Jan. '33) reports the clinical examples of allergy with symptoms strictly or mainly abdominal and he subdivides them under following groups :

(1) Cases presenting symptoms of an acute surgical abdomen.

(2) Cases presenting symptoms of dyspepsia or indigestion.

(3) Cases with symptoms of acute gastro-enteritis

(4) Cases with symptoms of chronic diarrhoea and mucous colitis.

1. The acute surgical abdomen—The author reports the case of a Jewish school girl suffering with recurring attacks, which began when she was two weeks old. The attack had prodromal period of uneasiness, anorexia and abdominal or epigastric discomfort. Later an exploratory operation was done and the appendix removed, but without any effect. The author then excluded at first those foods most commonly taken by a person from infancy to the age of twenty-four, hence milk, eggs and meats were eliminated and the attacks stopped. Milk was subsequently added to the diet on two separate occasions and the well recognised prodromal symptoms appeared. After withdrawal of milk from the diet she remained symptom free.

In another case fatty fish and pork fat caused severe abdominal attacks.

(2) Dyspepsia—A patient, a woman of twenty five, who in addition to mild urticaria, complained of pyrosis, eructation, fullness and anorexia of six months' duration. By restricting diets, it was finally determined that the trouble was due to fish and elimination of fish produced a cessation of both urticaria and dyspepsia.

(3) Acute gastro-enteritis—Acute gastro-enteritis with nausea, vomiting and severe diarrhoea beginning within an hour of eating.

(4) Chronic diarrhoea—Persistent diarrhoea and symptoms of mucous colitis may be present. Milk and eggs have been generally found to be causative factors in most cases. *J. N. D.*

Electro-cardiographic Findings in Syphilis

L. CHARGIN and S. PALEY (Amer. Jour. Syph. Vol. XVII, 82, Jan. 1933) as a result of their studies of 50 cases of primary and very early secondary syphilis of duration not longer than three months arrived at the following results :

1. Clinical right axis deviation was noted in 26%, 6% had an index below 10, 10% had an index between 10-15, and the remaining 5 or 10% had an index over 15. The high percentage of right axis deviation seems to be more than a mere coincidence. It may have some bearing on the syphilitic infection.

2. 8% showed definite myocardial involvement as evidenced by changes in the T-wave. One case showed iso-electric T-waves in Leads II and III, 3 cases showed definite inversion of T-waves in Leads II and III, the last 3 were associated with definite right axis deviation with an index over 15. *J. C. B.*

Longevity after Coronary Thrombosis

P. D. WHITE (The Lancet Annots. 426, Feb. 25, 1933) reports a case in which a man had a typical attack of coronary thrombosis at the age of 63. He made such a perfect recovery as to be passed for life insurance two years later, inspite of a careful examination of his heart. At the age of 72, he did a great deal of mountain climbing. 11 years after the attack he began to suffer from effort angina. On a restricted life, he kept on till the age of 80 when he died from cerebral haemorrhage. Old right coronary artery occlusion and a fibrous scar at the posterior aspect of the base of the left ventricle were found on autopsy.

The writer has under observation another patient aged 67, who had his original attack of coronary thrombosis 20 years ago and has survived 2 further attacks. This patient is still leading an active life.

Such cases show that coronary thrombosis is by no means always fatal and it may be followed by complete and lasting functional recovery, in a few cases. *J. C. B.*

The use of acacia in the treatment of oedema

A. F. HARTMANN, M. J. SENN, MARTHA V. NELSON and ANNE. M. PERLEY (Jour. Amer. Med. Assoc. 4 : 251 '33) describe that oedema of severe cases of nephrosis may be controlled by the proper use of acacia. In five out of six cases, diuresis followed the administration of acacia whenever the amount given was sufficient to bring the osmotic pressure of the serum to between 13 and 21 cm. of water. 2·15 gm. of acacia per kilogram of ideal body weight was found sufficient. In two cases, renal lesion promptly improved, the casts soon disappearing. The authors suggest that colloid osmotic pressure is reduced in oedema as a result of diminution of plasma protein and probably hydrophilic colloid acacia substitutes the albumin fraction.

J. N. D.

A note on the use of Marmite in tropical macrocytic anaemia, including pernicious anaemia of pregnancy

LUCY WILLS (I. M. G. 3 : 133'33) reports that marmite has a beneficial effect on the treatment of anaemia of pregnancy. Adequate doses of marmite are essential and she considers two drams three times a day to be sufficient. Sepsis must be excluded particularly in post-delivery cases. Reticulocyte response to treatment is to be judged by reticulocyte rise counted daily from the third to the tenth day. In desperately ill cases when digestion and absorption are greatly hampered, intramuscular or intravenous injection of liver extract along with blood transfusion is advisable. *J. N. D.*

SURGERY

Will bacteriophage prove the ideal wound treatment

F. H. ALBEE (Amer. Jour Surg. XV. 228, '32) recommends the use of bacteriophage in the treatment of osteo-myelitis. In 94% of cases of actute or chronic osteomyelitis a specific phage occurs spontaneously and in 6% the phage does not appear spontaneously and the laboratory is able to supply the phage specific for the organism in question whereas in 3% it has so far been unable to do so and this is particularly true of streptococcus haemolyticus. The primary bone incision is carried beyond the lime of demarcation of the affected bone. After thorough sterilization and cleansing the wound is packed with sterile yellow vaseline and gauze soaked in excess of the same. The packing is allowed to overflow the wound so that it covers an inch or more of the skin on either side. The dressing is left intact for eight to ten weeks when it is changed and reapplied after simple cleansing unless the wound is entirely healed. This procedure is repeated until the wound is completely healed. Antiseptics were avoided and he suggests that d'Herelle's principle of bacteriophagy was responsible for the success of the treatmeet.

J. N. D.

Relief of Pain in Cancer by Calcium

R. J. BEHAN (Amer. Jour. Surg. XIX, 2 : 301, 1933) reports that calcium has a great influence in relieving the pain due to cancer. He suggests, that in cancer pain is probably primarily due to changes in the metabolism of the tissues whereby lactic acid is formed causing irritation and this lactic acid is diminished by administering calcium. He concludes that calcium has an action on the perceptive centres of the central nervous system so that irritative impulses are less acutely perceived and suggests that this action aids in decreasing the pain perception in cancer.

In addition to calcium given by mouth, intra-muscularly or intravenously, vitamin D in any effective form should be given to cancer patients.

Changes in calcium metabolism are also produced by ultra-violet irradiation. Extract of parathyroid when given to a patient increased the serum calcium at the expense of the calcium which was present at the bones and that bone metastasis developed in patients under calcium treatment only with parathyroid extract.

J. N. D.

ANATOMY AND PHYSIOLOGY

Study of the effect of vitamin on growth, life and fertility.

F. GROEBELS (KLIN. WSCHR. 6 : 215, 1933) studied the effect of vitamin on young rats and reports that vitamin B in the form of yeast has no effect on reproduction whereas vitamin D causes a marked decrease of fertility and longer the female gets it, the more evident is the effect. He also reports better results with a combination of yolk of eggs and cod liver oil than with cod liver oil alone.

J. N. D.

Anatomy of the Autonomic Nervous System

S. W. RANSON (Annals. Int. Med. Vol. VI, 1013, Feb. 1933) gives a lucid description of the anatomy of the autonomic nervous system and makes use of a wide bibliography. In course of his article he emphasises on the following recent observations :

1. Visceral blood vessels only are surrounded and supplied by sympathetic plexuses but not the vessels of the extremities. The sympathetic plexuses surrounding the aorta is continued to a certain extent as far as the femoral artery. Beyond this, the vessels of the leg receive their innervation by way of branches from neighbouring somatic nerves.
2. The vessels and especially the arteries are sensitive to pain. They receive their sensory fibres from the spinal nerves.
3. There is enough experimental evidence to show that intracranial blood vessels are under vasomotor control.
4. The skeletal muscles are not innervated by sympathetic fibres, although a considerable number of such fibres is found on the intramuscular blood vessels.
5. The eye muscles, like the rest of the skeletal musculature receive no nerve supply from the sympathetic system.

J. C. B.

PATHOLOGY

Diazo Reaction : As modified, in the diagnosis of Typhoid fever

SYMONS (Med. 1 6 : 594, 1932 Ref. Jour Lab Clin. Med. 3 : 320, 1932) reports that this method gives more reliable results than those heretofore used.

Stock Solutions : (*a*) Dissolve 0·9 gm. of sulphanilic acid in water, add 9 cc. of 37 per cent Hcl, make upto 100 cc. with distilled water.

(*b*) Make up 5 grams of sodium nitrite 100 cc. with water.

(*c*) A 1'1 per cent aqueous solution of pure anhydrous sodium carbonate or a 3 per cent solution of crystalline sodium carbonate is used as the alkali.

Preparation of Reagent.—In a beaker containing an ice-water mixture place an empty test tube and a graduated cylinder containing 41 cc. of distilled water.

Into the test tube, pipette 1·5 cc. of A and 1·5 cc. of B, both cold ; leave for five minutes, add 6 c.c. of B, again leave for 5 minutes, then pour the contents of the test tube into the water in the graduated cylinder, and fifty cubic centimeters of reagent are thus obtained, which is stable for twenty four hours in the cold. Evolution of copious volume of gas indicates that the temperature is too high add the reagent is useless. The reagent should also be colourless.

The Test—Mix 2 cc. of the reagent with 5 cc. of C and within a minute and one drop of urine and observe the colour development against a white back ground.